

# CA JOURNAL

DOCUMENTS  
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## Air Traffic Control Report Aims at All-weather Safety

Acceptance of the recommendations made by the Radio Technical Commission for Aeronautics in its report entitled "Air Traffic Control" was announced recently by the Air Coordinating Committee. This study, prepared by RTCA Special Committee 31, composed of technical experts from both Federal Agencies and private organizations, sets forth interim and target programs (the former to be completed by 1953, and the latter by 1963) for the installation of all-weather navigation and landing aids and airways traffic control facilities and systems. Completion of these programs, which have been designed to satisfy military as well as civil requirements, will provide the maximum safety and dependability of aircraft operations under all-weather conditions.

In its acceptance of the report, the ACC recognized that in carrying out its recommendations, it may be necessary to modify the program from time to time, depending upon the results of specific research and development projects and upon changing operational requirements. In view of the interest of the Research and Development Board in the report, the Committee has requested the Board's concurrence with the Committee's action before the decision becomes final. The ACC authorized its Technical Division, which is responsible for the formulation of policy recommendations in the field of air navigation, to organize a steering committee for the purpose of following through on the implementation of the report. It is expected that one member of the steering committee will be a representative of the Research and Development Board which, under the Committee's decision, will be asked to assume responsibility for policy guidance in the carrying out of the research and development program called for in the report.

**RTCA Report Available.**—The RTCA has just announced that the printed text of the report, in which a separately issued preliminary paper entitled "The RTCA Program for an All-Weather Air Traffic Control System" has been included, may now be purchased for one dollar from the RTCA Secretariat, Room 597, Department of State Building, 17th and Pennsylvania Avenue N. W., Washington 25, D. C.

A condensation of the preliminary paper, which presents the broad outlines and requirements of the RTCA program, follows.

An integrated system of air traffic control is a vital necessity in the interest of national defense and national welfare. The RTCA program is intended to meet both military and civil requirements, based on a common solution that is best for each service. The

same system with the same tools gives the military maximum safety when operated to whatever capacity is required by military necessity; it gives the civil maximum capacity when operated to a specified standard of safety.

In the event of a national emergency, both civil and military aviation will be called upon to move  
(See RTCA Report, page 54)

## New CAA "Kit" Aids in Taking Commercial-pilot Examination

A "Commercial Pilot Examination Kit" giving detailed information on the commercial pilot written examination has been prepared by the Office of Safety Regulation, Civil Aeronautics Administration.

The "kit" includes a publication, "Commercial Pilot Examination Guide," which tells what material should be studied in preparation for the examination, how the examination is given and mechanically graded, and how to take the examination successfully.

The Guide also contains sample commercial pilot examination questions. The questions are not identical with those on real examinations, but follow the same pattern and cover almost the same topics. By using the sample questions, a ground instructor can prepare an almost infinite number of typical examinations for student practice.

Also enclosed in the kit is a World Aeronautical Chart which can be used in connection with navigation problems in the Guide, and an appropriate U. S. Weather Bureau Daily Weather Map.

The kit, which costs 30 cents, may be ordered from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

## Cross-wind Gear Demonstrated at National Airport

Culmination of CAA's \$150,000 cross-wind landing gear program, which may eventually save millions of dollars in airport construction costs, was marked April 15 when four different types of aircraft, equipped with cross-wind gear, landed at Washington National Airport crabbing into a 20-mile wind.

Observed by representatives of the aircraft industry, officials of the CAA, the Civil Aeronautics Board, and military representatives of the U. S. and other nations, a two-place Ercoupe, a four-place Bellanca, a twin-engined Beechcraft and a standard DC-3 made four landings each on the East-West runway against a wind directly from the north. Behavior of the larger planes proved the contention of CAA and aircraft industry engineers that planes of any size can be equipped with castering wheels for safe landings in cross-winds.

F. B. Lee, Acting Administrator of Civil Aeronautics, said that the CAA expects that decided savings in the airport-building program would be achieved when enough planes are so equipped as to make single runways adequate. Lloyd Child, Assistant to the Administrator for Personal Flying Development, and John H. Geisse, consultant to the CAA on the cross-wind program, added that the new type gear requires less skill of the airplane pilot, eliminates the possibility of ground-loop accidents, and, by making possible single-strip landing places closer in to congested areas, increases the utility of the personal plane.

**Craft Demonstrated.**—The DC-3 gear was designed and built by the Goodyear Aircraft Company, and this company has put its special type of gear on a Piper Cub, its own amphibian, a Stinson Voyager and a Cessna four-place plane. The Beechcraft gear was built by the All American Aviation Inc., of Wilmington, Delaware; the Ercoupe gear was designed and built by the Firestone Aircraft Company; and the Bellanca by the Bellanca Aircraft Company. Another gear was designed and built by the Fairchild Airplane and Engine Company for its primary training plane. This plane now is on a tour of the West Coast.

"This development now is ready for use by the in-  
(See Cross-wind Gear, page 51)

## Airport Revenues Will Mold Development of Civil Aviation's Future

The future well-being of airports, airlines and private flying—in short, civil aviation—depends to a great extent on the further development of airport fiscal matters, George W. Burgess, Deputy Administrator of Civil Aeronautics, told the Airport Operators' Council in an address at Boston in April.

Both the supplier and user must prosper, Mr. Burgess declared, or the public will lose a new and valuable means of communication and transportation.

Private enterprise, in this case the consumer of a public product, cannot be expected to provide airports, Mr. Burgess said, because even at a well-developed and fully used airport, utilized extensively by transport aircraft, the ratio of capital investment to gross revenues is 15 or 20 or more to 1. Secondly, with the important exceptions of long distance passenger travel and premium letter mail together with employment with such air transport operators, the benefits of civil air transport to the community, its state, and the nation, are largely potentialities. In addition, Mr. Burgess continued, the airport or airpark by its very existence and regardless of the direct revenues or deficits resulting from its operation, is a facility which attracts people, business and trade to itself and to a community.

**Aviation Payrolls Large.**—Citing San Francisco as one example, Mr. Burgess pointed out that this City "has found that aviation payrolls (other than manufacturing) created by activities at the airport amount to some \$20,000,000 and are barely surpassed only by water transportation. Revenues derived from airline and private plane passengers by hotels, stores and other business amount to approximately \$12,000,000."

Furthermore, he continued, "the fact that air cargo, which only came into existence about two years ago, will generate over 200,000,000 ton miles this year, or approximately twice the equivalent in passenger miles of all the airlines in 1941, demonstrates the relationship of actuality to potentiality in this segment of air transportation, and the significance of air cargo to individual cities and towns."

From the national viewpoint, Mr. Burgess said, the Federal Government is actively fostering and participating in the construction of airports and the development, establishment and operation of radio aids to air navigation for the following three paramount and inter-related reasons: the fostering of civil aviation and commercial air transportation as a new industry that will in itself create new employment; the benefits that these will have on all businesses, individually and collectively, and on the nation's economy generally; and national security. It seeks no direct return on the capital provided and by the same token others are expected to make no direct profit on these Federal outlays.

**Breakdowns for Capital.**—Mr. Burgess gave the following breakdowns for the provision of capital for airports.

1. That it be the responsibility of city (and/or county) to (a) supply capital for the landing area; (b) supply capital for buildings, facilities and equipment needed in the operation of the airport if private funds are not available; (c) provide capital for access roads, together with improvements and protection to air approaches and to the ground area contiguous to the terminal, hangar and landing areas; and (d) promote actively the establishment by private enterprise of non-aeronautical income-producing com-

## "Certify Own Products" Is CAA Proposal to Private Plane Builders

A proposal that personal aircraft manufacturers who have met and continue to maintain adequate standards of fitness and ability be allowed to certify to the airworthiness of their products is being circulated by CAA, moving a step further in its program of delegating responsibility to the industry.

The Aircraft Industries Association of America, a trade association of the manufacturers; the Aircraft Owners and Pilots Association, representing the owners and pilots; aviation underwriters; and 500 owners of personal aircraft, selected at random from the CAA's list of 90,000, have been asked to study the proposal and offer their comments.

The proposal provides for simplified airworthiness standards to be prepared by the industry and termed "Personal Aircraft Airworthiness," or optionally, a light aircraft specification to be submitted to the CAA for review.

After analysis of the comments received, CAA will submit to the Civil Aeronautics Board recommendations for appropriate amendments to the Civil Air Regulations.

**In Accord with Trend.**—The Civil Aeronautics Administration, points out that the current proposal is in accord with a trend of recent years, during which CAA has appointed several thousand inspection representatives throughout the country to license planes and pilots and check their continued airworthiness and competency.

Prior to his resignation as Administrator, T. P. Wright wrote to O. P. Echols, President of the Aircraft Industries Association of America: "I feel that we have reached the time when we should provide for the assumption of complete responsibility of light aircraft manufacturers for the safety and integrity of their product when found competent to do so."

Suitable penalties for non-compliance, false statements, or other irregularities would be provided under the proposal.

mercial, service, recreational and other activities on the airport property and in the buildings.

2. That the community should encourage private enterprise to provide the capital for everything but the landing area and terminal building. Mr. Burgess declared that "there appears no good reason why through leases, fees, or charges based on minimum payments and minimum quality of facilities and service, together with the percentages of gross, that the airport cannot generate as much or more net revenue and provide more efficient services through private enterprises than by providing these itself."

3. That the state aid the city insofar as capital resources and laws of the state can assist, and insofar as it is agreed with the city that the state's assistance is desirable.

4. That the Federal Government should participate insofar as the Federal Airport Act and funds appropriated thereunder will permit.

In closing, Mr. Burgess dealt in considerable detail with such items as landing area fees, terminal building and hangar space rentals, and the sale of gasoline as a means of providing a return for capital invested.

**Source of Revenues.**—He declared that "the terminal building and the area around it provide space for non-aeronautical activities of a commercial and recreational nature which can and must generate the majority of most large airports' revenues if they are to become self-supporting.

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DEPARTMENT OF COMMERCE

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Civil Aeronautics Administration

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## CAA and CAB Releases

Copies of CAA releases may be obtained from the CAA Office of Aviation Information. CAB releases are obtainable from the Public Information Section of the Board. Both offices are located in the Department of Commerce Building, Washington 25, D. C.

### Administration

CAA Announces Designation of Skyway #2 with Terminals at Seattle and Boston (March 26).

First of 130 new Instrument Landing Charts Announced by CAA (April 1).

Airway Flights Increase CAA Report Reveals (April 1).

CAA Contracts for Radar Sets at Eight Airports (April 5).

100 Jobs Being Done by Planes in U. S., CAA Reports (April 8).

Fire Towers to be Marked to Aid Plane Pilots (April 8).

CAA to Demonstrate Five Airplanes with Cross-wind Landing Gear (April 12).

Filipinos Arrive for CAA Air Traffic Control School (April 19).

Four Types of Planes Demonstrate CAA Cross-wind Landing Gear (April 15).

Rancher Flies 32,000 Miles a Year, Proves Airplane's Value, CAA Says (April 25).

CAA Offers Commercial Pilots Examination Kit (April 21).

CAA Proposes that Industry Take Over Certification of Products (April 26).

### Board

Harold A. Jones Sworn in as CAB Member (CAB 48-23) March 29, 1948.

Hearing Date Set on Delta Airlines, Inc., Accident at Municipal Airport, Chicago (CAB 48-24) March 31, 1948.

Joseph J. O'Connell Sworn in as CAB Chairman (CAB 48-25) April 6, 1948.

Big Five Service Mail Rates (CAB 48-26) April 7, 1948.

Aleutian Islands Route (CAB 48-27) April 9, 1948.

Hearing Date Set on Northwest Airlines Alaska Accident (CAB 48-28) April 14, 1948.

Suspension Continued in Air Freight Rate Case (CAB 48-29) April 14, 1948.

Flight Engineers (CAB 48-30) April 15, 1948.

Farewell Party Given for Harlee Branch by the Staff of the CAB (CAB 48-31) April 21, 1948.

Decision in Air Freight Rate Investigation (CAB 48-32) April 22, 1948.

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# Problems in International Aviation Confront Entry Airport Managers

A complicated situation which exists in international aviation, posing problems for managers of airports of entry, was outlined by H. G. Tarrington, Chief International Service Officer, Staff Programs Office, Civil Aeronautics Administration, in a recent address at the first annual meeting of the Airport Operators' Council in Boston.

Two problems which the Federal Government is striving to solve are linked with the dual position occupied by the manager of an airport of entry, Mr. Tarrington stated, continuing as follows: "First, he is the host to those persons who come to the United States by air, and whose first contact with this country happens on his airport and with him or his employees. Second, he is the landlord of several Federal agencies which must transact their business at his airport."

First impressions often are the lasting ones and they should be good ones, he declared. "In 1928, there were 1,873 international passengers carried by air into the United States. Last year there were 1,412,580. We all agree this growth will continue. That means that a great number of people will get their first impressions of America at its airports of entry."

**Facilities Are Important.**—Cheerful, clean facilities around an airport are highly important not only because they create favorable impressions which can affect the airport's future and make the difference between solvency and failure, but because such surroundings make friends. They have concrete importance in Government's job of facilitating international air operations.

Mr. Tarrington pointed out that "five Government agencies operate at airports of entry and the provision of adequate space for their operations brings the manager and the Federal Government close together. These agencies are the Civil Aeronautics Administration, the Customs Bureau, the Immigration and Naturalization Service, Public Health, and the Agriculture Department. Things are not yet working smoothly between the landlord and the tenant", he said, but eventually we will arrive at a standard which can be followed at all points.

An Interdepartmental Committee on Airport Facilities, composed of one member from each of these five agencies, has been established to cope with the need for standardized Government space requirements, Mr. Tarrington revealed. Airport management can assist in facilitating international air operations by coordinating building plans with this Committee to insure adequate space for Government inspection services, sequence of inspection, location of waiting rooms, health offices, rest rooms, information and currency exchange booths, etc.

At present, the work of this Committee is complicated by laws passed by Congress which provided that these accommodations are to be provided by the air carriers, he declared. "Many agencies of the Government believe the Government should pay for the space required for the performance of official functions. Moreover, there is considerable opinion that Congress would not look with favor on any plan which would impose this expense on Government." Airport management can be of assistance, Mr. Tarrington said, by having a full understanding of the Committee's problems.

**Overtime Pay is Problem.**—"Another vexing problem in the simple act of flying across a national boundary", he continued, "is the payment of overtime to inspection personnel. Both the airlines and the Government have advocated a re-examination of this procedure".

Mr. Tarrington pointed out "that a recent ruling of the Immigration and Naturalization Service stipulates that no overtime payments for immigration inspection services will be assessed against a scheduled

carrier if it arrives during a period when inspectors are on a regular tour of duty, irrespective of the time of arrival. However, if a scheduled air carrier arrives off schedule and requests special immigration inspection services, such services will be provided by the payment of overtime for additional immigrant inspectors." The private flier, he said, "who does not operate on any schedule, and who frequently cannot know all of the conditions at a given airport of entry, sometimes runs up against very heavy charges in overtime, guarding of his airplane, transportation of inspection personnel to the field, etc."

**Eight Agencies Represented.**—An Interdepartmental Committee on Overtime Pay of Certain Inspection Personnel, consisting of a representative from the Bureau of the Budget, Civil Aeronautics Administration, the Departments of Commerce, Treasury and Agriculture, Public Health Service, Civil Service Commission and the Immigration and Naturalization Service is at work on the overtime pay problem, he stated, and so far has studied the following policy questions:

1. Should the Government require reimbursement on a variable basis, i. e., commercial traffic at a different rate from private or non-commercial?
2. Should pay be based upon the salary of the officer conducting the inspection, or should there be a fixed fee?
3. Should the Government assume the entire cost, including extra service and overtime?
4. Should employees receive premium overtime pay for this type of overtime, plus Sunday or holiday pay; or should Government pay and absorb cost; or should industry reimburse?
5. What categories of personnel should be entitled to overtime pay?
6. Under what circumstances should overtime pay be due?

In conclusion, Mr. Tarrington remarked, "We can say glibly that the airplane has flown head-on into horse and buggy methods of handling international travel; that the Government is operating on the 19th Century rules in the control of a 20th Century transportation industry." However, a great deal of progress has been made since these two committees were organized and eventually the role of the landlord and the tenant will be clarified and the handling of goods and passengers in international air trade will be done with smooth-running human machinery.

(NOTE: A complete report, covering the many technical aspects of the problem of facilitating international air travel, has been prepared by the Civil Aeronautics Administration. Copies are available from the CAA's Office of Aviation Information, Department of Commerce Building, Washington 25, D. C.)

## Cross-wind Gear

(Continued from page 49)

dustry," John R. Alison, Assistant Secretary of Commerce said, after witnessing the tests. "The CAA has supervised and financed the development. Acceptable designs are available and ready for application to existing planes. They can be installed on new planes at the factory or applied to planes already in use. We will continue our development on larger type planes as far as we are able, but we hope the new gear will appear soon on new models of many different types."

## Fire Towers, Stations Are to be Air-marked; Will Aid Visual Fliers

As a safety aid to the visual flier, about 3,200 fire towers and lookout stations of the U. S. Forest Service are to be air-marked under the supervision of the Civil Aeronautics Administration.

The buildings to be air-marked are located in 167 National Forests and most of them are in potentially dangerous terrain. Marking of the 179 towers and lookout stations in mountainous areas of Pennsylvania is virtually completed. Oregon and Montana are next on the airmarking program.

**Conform to Roof Size.**—The markers were especially designed to conform to the size of the roofs on which they will be placed, and are considerably smaller than the standard airmarkers. However, they can be clearly seen by a pilot flying 1,000 feet above them. They will carry a letter or letters three feet high designating the state, and numerals of the same size indicating location.

The pilot, by reference to his aeronautical chart, will be able to place himself exactly. Fire towers and lookout stations are indicated on the charts by a small black triangle within a circle, and close to the symbol is the abbreviation for the state and the number fixing the geographical location of the marker.

Under the method followed in Pennsylvania, which in general outline will be adopted in other states, the towers are numbered beginning at the northwest corner of the state and the numbers are carried to the east along a horizontal line as nearly as tower and station situation permits. Returning to the western boundary, the process is repeated until the state is covered. The numbering in each state will begin with one.

**New System Adopted.**—To designate states it was necessary to develop a new system of abbreviations to keep the markers within roof space limitations. Frequently only a single letter is used. For example, California, Colorado and Connecticut are identified by C, the distance separating these states making confusion improbable.

In Pennsylvania the cost was borne by the State Aeronautical Commission and it is expected similar methods will be followed in other states.

## History-Making Solo Flights

Twenty-one years ago this month the first successful solo transatlantic flight was made by Charles A. Lindbergh in the Spirit of St. Louis. Taking off from Roosevelt Field, Long Island, New York, on May 20, 1927, Lindbergh landed the next day at Le Bourget Field, Paris, a distance of 3,610 miles. The trip took 33 hours and 30 minutes and won for him the \$25,000 prize offered by Raymond Orteig.

Exactly five years later to the day, Amelia Earhart accomplished the same feat, becoming the first woman to fly the Atlantic solo. She completed the 2,026-mile hop from Harbor Grace, Newfoundland, to Londonderry, Ireland, in exactly 15 hours and 18 minutes, thereby gaining the distinction of being the first person to fly the Atlantic twice. In 1928, Miss Earhart made the flight as a passenger with Pilot Wilmer Stultz.

Data on other U. S. Aviation Firsts may be found in the "CAA Statistical Handbook of Civil Aviation". This publication can be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., for 25 cents a copy.

**Pan American's Flight 131.**—Electrical arcing between the battery "bus" and an engine control pulley bracket in the No. 3 engine nacelle, resulting from the lack of adequate protection for the "bus", was cited by the CAB as the probable cause for an emergency landing by Pan American Airways' Flight 131 at Floyd Bennett Field, Brooklyn, New York. None of the 41 persons aboard were injured although the aircraft received major damage.

Flight 131 left Bermuda at 1:58 p. m. on September 20, 1947, with 36 passengers and a crew of 5. Take-off and climb to the cruising altitude of 8,000 feet were normal and the flight proceeded on course to LaGuardia Field, New York, for 3 hours without incident.

Between 4:50 and 4:55 p. m., about 225 statute miles from destination, the first officer noticed a fluctuation in fuel pressure for engines 1 and 2. Seconds later, the left auxiliary fuel tank quantity gauge dropped to zero, the fuel pressure warning light flashed on, and No. 1 engine faltered. To insure a positive fuel supply for all engines, the first officer immediately turned the fuel selector valves for all engines to their respective main tanks<sup>1</sup> following which all engines operated normally.

Fuel was then transferred from the right to the left auxiliary tank so that they would contain equal amounts. The quantity gauges showed 40 gallons after the transfer. Shortly thereafter, however, the right auxiliary fuel gauge indicated not 40 but 100 gallons and continued to increase although fuel was no longer being transferred. The No. 3 main fuel tank gauge then dropped to zero and the fuel pressure for the No. 4 engine started to fluctuate. Alarmed by what now appeared to be a serious malfunction in the right side of the fuel system, the first officer operated all engines from the left main tanks (1 and 2), turning on all the cross feed valves, and the booster pumps for main tanks 1 and 2.

At this point the flight was 212 statute miles from LaGuardia. The captain, unable to account for what appeared to be a total loss of fuel in the right main tanks, tried to operate engines 3 and 4 from their respective mains. Shortly thereafter, the fuel pressure for both these engines dropped, the fuel pressure warning lights came on, and engines 3 and 4 lost power. Other combinations of fuel valve settings were tried during the next few minutes, but power could not be restored to engines 3 and 4.

The "fasten seat belt" sign was turned on, rated power was applied to engines 1 and 2, and a descent of 200 to 300 feet per minute started. Two minutes later the fire warning light flashed on for engine 4. The flight radio officer was sent to the passengers' cabin to see if any signs of fire from this engine was visible. He saw none from engine 4, but smoke was trailing from engine 3. The smell of burning rubber was then noticed in the cockpit and the fire warning light for engine 3 was on. No flames from either engine were visible, however. Standard fire fighting methods were followed to control the fire in the No. 3 nacelle. The propeller was feathered, all fluids into the engine were closed at the emergency shutoff valves, and the CO<sub>2</sub> gas bottle was discharged. The fire warning light then went out. As a precautionary measure, the shutoff valves for all fluids into the No. 4 engine were closed and an attempt made to feather the propeller. It would not feather, however, and continued to windmill.

At 5:12, a loud noise from the right side of the plane was heard. Simultaneously, the green right landing gear light came on. Through the drift sight the crew could see the right outboard tire burning and

a landing gear bungee cable hanging slack. All attempts to raise the right gear were unsuccessful. It was found that with the right gear down, and with both right engines "out" that an air speed of 125 MPH was required to maintain directional control. At 5:30, engine 4 stopped windmilling, having seized from lack of lubrication.

By 5:45, the altitude was about 1,000 feet and over 100 statute miles remained to destination. Full take-off power was applied to engines 1 and 2 in an attempt to hold the remaining altitude. Altitude had been lost to 800 feet by 6:00 p. m. and over 50 statute miles remained.

Preparations were made for "ditching" and passengers were instructed in the use of life jackets and emergency water-landing procedures. The flight radio officer broadcasted "blind" on the frequency 8280 kcs., reporting the position of the flight to be 40-00° north and 73-10° west. From this point on only a small gradual loss of altitude was experienced and the captain decided to attempt to reach and land at Floyd Bennett Field. He was advised through Eastern Air Lines' radio that runway one would be available.

New York air traffic control had been alerted through EAL's radio of the emergency, and they in turn had called Coast Guard search and rescue. Coast Guard, Army, and Navy rescue equipment was dispatched. As Flight 131 approached the coast, the crew observed other aircraft and surface vessels coming out to meet them. By 6:15 the flight had descended to an altitude of 400 feet and was approximately 15 miles from Floyd Bennett Field. About five minutes later the aircraft maneuvered into a position for a straight-in landing approach on runway one.

It was set down 775 feet from the south end of runway one, wheels up. During the course of the crash landing the No. 1 propeller was torn from the engine, the propeller dome becoming embedded in the No. 2 main fuel tank. The spilled gasoline was ignited by sparks generated as the plane skidded 2,167 feet on the concrete runway to a stop. U. S. Navy fire and crash equipment brought the fire under control quickly, however, and assisted the passengers and crew to deplane without injury.

**Three Killed in Mountain Crash.**—An attempt to continue visual flight into instrument weather caused the death of three persons when their plane crashed against a fog-covered mountain near Christiansburg, Va.

The pilot, Harry C. Hippert, held a commercial rating to fly single and multi-engine land planes but was not rated as an instrument pilot. He carried two revenue passengers—Drs. Preston Burton and Gilbert Burton.

The three took off from Roanoke, Va., on a cross-country flight to South Dakota. No flight plan was filed. The pilot reported the weather conditions at the time as: Roanoke—ceiling 1,200 feet, visibility 5 miles, light rain, light fog; Pulaski, Va.—ceiling 800 feet, overcast 2,000 feet, visibility 3 miles, light fog. Two mountain ranges between Roanoke and Pulaski rise to an elevation of about 3,000 feet.

The plane was observed flying extremely low over Highway 11 in a westerly direction and about 4 miles east of Christiansburg it was seen entering the overcast in a climbing attitude. It collided with a tree on the mountain shortly thereafter and burned.

There was no evidence indicating fire in flight. The last known witness to the flight stated that the engine sounded normal and there was no indication of fire. The possibility that a slight flash fire occurred in the engine just prior to the crash would account for the flame impingement found on the carburetor hot air control box unit, investigation disclosed

**Explosion Kills Four.**—Disintegration of the right wing, resulting from an explosion of a fuel-air mixture in the right wing panel, was cited by the Civil Aeronautics Board as the probable cause of an airplane crash which killed four near Walker Field, Ada, Oklahoma. Ignition may have resulted from the operation of the landing gear position switch, the Board said.

The flight left Hot Springs, Ark., around 10 a. m. on April 13, 1947. It is not known who actually flew the craft, however, the occupants consisted of Mr. and Mrs. Tom Norris, and Mr. and Mrs. Frank Norris. Since both men were pilots, and qualified to fly this particular airplane, it is probable that either one was at the controls and that their wives occupied the rear seat of the aircraft.

The exact flight path from Hot Springs to Ada is now known. The plane was equipped with a two-way radio, but no reports from the flight were received by any of the Civil Aeronautics Administration's communication stations. The day before departure, the aircraft had been completely serviced with full tanks of fuel which were more than ample for the non-stop flight from Hot Springs to Ada, a distance of 205 miles, assuming a straight line course.

Between five and ten minutes past noon, the craft was heard over Walker Field, Ada, Oklahoma. It was not seen, however, because of a low overcast condition and restricted visibility which prevailed in the vicinity. The plane circled to the left, and was first seen a few minutes later below the overcast, flying approximately straight and level at an altitude of about 100 feet, and clearly above all obstructions. At this time it was two miles northeast of Walker Field, in position for an approach for landing on Walker Field.

Witnesses in the nearby vicinity observed the nose wheel of the landing gear extend and almost simultaneously they saw smoke around the fuselage and heard an explosive sound. The right wing appeared to disintegrate in the air and the aircraft crashed into farmland one mile northeast of Walker Field. It was enveloped in flames immediately.

**Crashes Into House.**—Pilot Harvey J. Thornton, his wife, and 12-year old Holk Ecklund, all of Lake Wales, Fla., were killed when their plane crashed into a house and burned in the residential section of Sanford, Fla., about 1½ miles northwest of that city's airport.

On January 17, 1948, Pilot Thornton took off from Sanford Airport about 5:30 p. m. after announcing his intention of returning to Lake Wales. Thirty minutes later he returned to the field, landed and took off again to the northeast after a few minutes on the ground.

Shortly thereafter the plane was seen flying low, northwest of the airport. From this position it was observed to fly eastward and after passing from sight was heard to turn south. It was again witnessed for a few seconds just prior to the crash, flying very low in a climbing attitude with the engine roaring. Almost simultaneously with being seen, it struck the top of a tree, nosed down and ploughed through a house—coming to rest in flames about 20 feet beyond. The residence, which was unoccupied at the time, was destroyed by the impact and subsequent fire.

Competent witnesses stated that at the time Pilot Thornton first took off, weather conditions were way below minimums with not much prospect of clearing, and a certificated flight instructor described the weather at the time of final take-off as "dark and raining hard, with ceiling about 200 feet".

Thornton was a certificated pilot with commercial, single and multi-engine land, and flight instructor ratings and owned the plane he was piloting.

<sup>1</sup> One main tank is installed in this type craft for each engine and is numbered so as to correspond to the engine, i. e., No. 1 main tank is located in the wing panel next to, and normally feeds, the No. 1 engine. In addition to these 4 main tanks, there are 2 auxiliary tanks, one in the left and one in the right wing panel.



## New CAR Amendments Call for Flight Engineer

Part 41 of the Civil Air Regulations entitled "Certification and Operation Rules for Scheduled Air Carrier Operations Outside the Continental Limits of the United States" and Part 61 entitled "Scheduled Air Carrier Rules" have been amended by the Board so as to require flight engineers on the Douglas DC-6 and the new Boeing 377 "Stratocruiser". The new amendments will also permit the Administrator of Civil Aeronautics to require flight engineers on other aircraft, including the Douglas DC-4, where such crew member is essential for safe operations.

A public hearing was conducted by the Board on October 6-8, 1947, to determine whether additional flight crew complement should be required on air carrier aircraft. As a result of testimony at this hearing, the Board believes that a competent flight engineer, by assuming certain mechanical duties, will enable pilots to concentrate their attention on the actual flight of the aircraft, radio operation, and receipt of traffic control clearances, particularly during instrument conditions where this is imperative.

The Board stated, in establishing the Regulations that an airman holding a flight engineer certificate shall be required as a flight engineer on all craft certificated for more than 80,000 pounds maximum take-off weight. It declared further, that all other aircraft certificated for more than 30,000 pounds maximum take-off weight, be required to utilize the services of a flight engineer where the Administrator of Civil Aeronautics finds that the design of the aircraft or the type of operation is such as to require engineering personnel for the aircraft's safe operation. Thus, under certain operating conditions, such as extended over-water flights, the safe operation of the Douglas DC-4 may require the assignment of a flight engineer.

Realizing that these amendments may require the training of additional personnel, the Board set December 1, 1948 as being sufficiently advanced to constitute a firm compliance date.

## February Plane Shipments Show Increase Over January

During February, manufacturers shipped 613 aircraft, a slight increase over the 607 reported for January. Total shipments for the first two months of this year were far below 1947—1,220 aircraft as against 4,290.

February civil aircraft shipments follow:

	February	January
Total	466	471
By type:		
Personal (under 3,000 pounds air-frame weight)	452	458
Transport (over 3,000 pounds air-frame weight)	14	13
By number of places:		
2-place	220	229
3 and 4-place	228	216
Over 4-place	18	26
By total rated horsepower (all engines):		
1-74 hp	35	63
75-99 hp	159	148
100-399 hp	256	245
400 hp and over	16	15

Shipments to U. S. military customers totaled 147 aircraft—24 percent of the February total. Civil shipments totaled 466 aircraft with a combined air-frame weight of 581,100 pounds, a slight decrease in

## Mail Pay Increase for Five Major Airlines Is Proposed by CAB

A statement of tentative findings and conclusions, proposing an increase in the rate of mail pay within the continental United States by American, Eastern, Northwest and United Air Lines and Transcontinental and Western Air, has been issued by the Civil Aeronautics Board.

The new rates of pay become effective January 1, 1948, on all the carriers named, with the exception of American, which is effective on and after the date of service of Board order E-1351 attached to the statement.

The proposed new service rate formula is as follows:

Mail ton-miles per day	Ton-mile mail rate applicable to each block	Mail ton-miles per day	Ton-mile mail rate applicable to each block
0-2,500	75.0	15,001-20,000	55.0
2,501-5,000	70.0	20,001-25,000	50.0
5,001-10,000	65.0	25,001-30,000	45.0
10,001-15,000	60.0	30,001 and over	40.0

In the application of the above formula, the indicated ton-mile mail rate applicable to each block of mail ton-miles performed per day is applied to the mail volume in each block, so that each successive increment in mail volume is carried at a lower ton-mile rate. On the other hand, if the volume of mail is less than estimated for the future, the effective yield for each carrier will be somewhat higher. On the basis of the estimated number of mail ton-miles to be performed by each of the five carriers in the future period, the mail rates in the table above should produce annual mail pay and an effective mail rate per ton-mile as follows:

Carrier	Annual total	Mail ton-miles		Effective mail rate per ton-mile
		Daily average	Annual mail pay	
American	7,597,000	20,814	\$4,757,000	62.62
Eastern	3,808,000	10,433	2,604,000	68.38
Northwest	2,323,000	6,364	1,647,000	70.90
TWA	8,368,000	22,926	5,142,000	61.45
United	9,620,000	26,356	5,743,000	59.70

A comparison between the old rate and the present rate per ton-mile, with the increase in dollars from the new rate, follows:

Carrier	Old mail rate per ton-mile	New rate per ton-mile	Estimated annual increase in dollars
American	45	62.62	\$1,338,000.00
Eastern	45	68.38	890,000.00
Northwest	60	70.90	253,000.00
TWA	45	61.48	1,376,000.00
United	45	59.70	1,414,000.00

number but a 23 percent increase in weight over January.

February civil aircraft shipments were valued at \$5,139,000, an increase of 13 percent over the \$4,554,000 shipped in January. The increase in value reflects a gain in shipment of larger planes.

## Contract for GCA Sets Awarded by the CAA

The Civil Aeronautics Administration has announced the award of a contract for the manufacture and installation of eight precision beam and search radar sets, commonly known as GCA or ground controlled approach equipment.

The first will be installed at Los Angeles Municipal Airport in about 12 months, the others will be installed at short intervals thereafter at Cleveland, Atlanta, St. Louis and Boston, and as replacements of converted military equipment at Washington, New York, and Chicago.

**Gilfillan Bros. Get Contract.**—The contract was awarded to Gilfillan Bros., Inc., of Los Angeles, and calls for incorporation of improvements developed in the last six years. These include MTI, or moving target indicator, which eliminates from the scope "ground clutter" of buildings, etc.; increased search coverage to show all aircraft up to 10,000 feet altitude and out to 35 miles; and an Azel three-dimensional scope to show altitude, distance, and direction of aircraft.

With the new radar sets, a two-man CAA crew in the control tower will be able to keep track of the location of aircraft in all weather, and in turn be able to guide them to a landing if desired. The GCA sets will serve also as "monitors" on the CAA instrument landing systems, permitting the tower operator to "see" whether the pilot is correctly following the ILS radio path. Twenty-four hour operation is planned.

The present GCA equipment operated by CAA at New York, Washington and Chicago is credited with 27 "saves" of pilots in difficulty.

## Traffic at National Airport Registers Seasonal Decline

Airline passenger traffic at Washington National Airport during the first quarter of 1948 suffered its usual seasonal decline with activity somewhat below the fourth quarter of 1947. Passengers passing through WNA totaled 216,445, divided almost equally between arrivals and departures. First quarter business in 1947 totalled 218,586 passengers. March was the quarter's best month with 88,449 passengers arriving and departing, slightly ahead of 1947.

Total airliner arrivals and departures were also off seasonally from the last 3 months of 1947 but were up slightly from the first 3 months of 1947—23,829 versus 23,078. Military aircraft traffic held its own with 3,459 movements compared to 3,424 in the last quarter of 1947 but itinerant operations were off 18 percent to 4,074.

The following table shows the total activity at Washington National Airport during the first quarter of 1948, 1947 and 1946:

### Scheduled Air Carrier Passengers

	1st quarter	Total	Arrivals	Departures
1948		216,445	108,388	108,057
1947		218,586	103,538	115,048
1946		202,577	97,984	104,593

### Aircraft Arrivals & Departures

	1st quarter	Total	Air carrier	Military	Itinerant	Local
1948		32,670	23,829	3,459	4,074	1,308
1947		35,970	23,078	4,118	4,440	4,334
1946		37,029	22,063	7,575	3,544	3,847

# RTCA Report on Air Traffic Control

## Aims at Safe All-weather Navigation

(Continued from page 49)

key men and equipment. Air terminals where traffic is normally low, can be called upon suddenly to handle more aircraft than now fly into the New York area. The only method of meeting such a sudden demand for increased traffic is an effective air traffic control and navigational system already in being before the crisis.

All aircraft in a region must be accounted for and any unidentified aircraft promptly investigated. These measures will permit the first action to be taken after initial warning of a surprise attack. Another important consideration is the ability to clear civil aircraft out of a combat region and to direct fighter planes into the region and control their actions. It is particularly important to be able to land combat planes rapidly in any weather, refuel them, and return them to the battle promptly.

**Pilots Constitute Reserve.**—The airline pilots and well-trained private pilots constitute an immediately available reserve on whom the military can draw for their initial expansion. It is highly desirable that all classes of pilots be trained in the use of the system well in advance, since the confusion and disruption of a surprise attack would probably paralyze the slightest attempt at education in the use of an unfamiliar system.

Integration of the air traffic control and navigation system with the air defense and early warning system will solve these problems.

**Program Partially Self-supporting.**—Such an integrated system as part of the national security program will be partially self-supporting. There will be an improvement in airline finances when the airlines are able to operate without cancelling trips. The United States airlines lost \$22,000,000 net in 1947. In 1946 the airlines suffered losses of actual and potential revenue from various sources totalling \$39,500,000, which is broken down as follows: cancellations due to weather—\$6,200,000; low load factor resulting from unreliability—\$12,200,000; and congestion at 13 stations at which studies were made—\$21,100,000.

Presumably losses at other congested stations where studies were not made also contributed. The losses to private operators, military, contract and nonscheduled services cannot be estimated but are certainly appreciable. Thus it is seen that an effective all-weather air traffic control and navigation system would have saved considerable money.

This country has an estimated six billion dollars invested in civil airports which are closed approximately 15 percent of the time due to weather. All-weather flying would be equivalent to increasing our airport values by \$900,000,000 even before an additional acre of land is condemned or a yard of concrete is laid.

There are other less tangible but nevertheless real economic gains that can accrue by solving the air traffic control and navigational problem. The ability to get key personnel and products from one section of the country to another rapidly—a vital factor in production efficiency—is one example.

**The Present Situation.**—Every citizen having any acquaintance with flying knows well the inability of the existing techniques of traffic control to handle the present volume of air traffic, particularly under adverse weather conditions. The Civil Aeronautics Administration is charged by statute with regulation of air traffic. The tools available to the CAA to discharge this responsibility are marginal even by pre-war standards. Traffic controllers are struggling valiantly to handle an increasingly difficult situation. At present, the only position information available to controllers are navigational estimates of positions re-

ported by aircraft pilots. These may be in error by many miles, either from instrument error in the aircraft or from delay in receipt of reports. The use of additional controllers will be of considerable benefit but, as traffic increases, will reach a point of diminishing returns. The volume of communication necessary with the present techniques is a limiting factor; in fact, over-saturation of communication channels already exists in some areas.

The position estimates received from the pilots of aircraft are manually posted and estimates are made from these postings to effect separation of aircraft. With this inefficient setup, the CAA controllers have indeed done an amazing job. It is true that, for safety reasons, passengers expecting to arrive at Washington at 6:30 P. M. may well land at Philadelphia at 11:45 P. M. The current system is cumbersome, but the controllers have conscientiously tried to keep it safe.

The CAA has recognized its need for improved tools for the control of air traffic. It has been hampered in obtaining them by the confusion of riches resulting from accelerated development in radio devices during the war. The laboratories of the armed services, of industry, and of the CAA itself have been most active in the application of war-borne techniques to the problems of aerial navigation and the control of air traffic. Time has been needed to consolidate the results of these activities into a single working system suitable for national defense and civil aviation. It is believed that such consolidation is here accomplished and that the single system defined will serve throughout the foreseeable future.

**Fundamental Principles.**—The fundamental principles which govern the design of a traffic control and navigation system are:

Aircraft must be flown safely; air traffic must flow expeditiously; airborne equipment must be universal, simple, and light; the system must impose a minimum burden on the pilot and on ground personnel; the system must impose minimum cost on the taxpayer, the airlines, and the private pilot.

Consideration of the five fundamental principles listed above with the realities of flight and of electronic equipment leads to the derivation of a set of secondary requirements which follow.

The system must be capable of being set up on a single site and provide navigation and traffic control out to a line-of-sight distance; the system must provide identification of all airplanes; the system must derive information to be used in traffic control from the ground equipment and information to be used in the airplane from the airborne equipment; the system must operate on the closed-circuit principle; all elements of the system must be interlocked (i. e., provision for protection of wrong action) so as to preclude the possibility of human error; a flow control system is required to sequence planes in crowded areas and complicated traffic patterns; the system cannot be built by the addition of all desired techniques but must be designed with the minimum number of equipments necessary and with an eye toward an orderly evolution and integration.

The foregoing requirements lead directly to systems of navigation which locate an aircraft by its distance and direction with relation to a chosen point—the much discussed polar-coordinate or R-Theta systems. A program for installation of VHF omniranges and distance measuring equipment represents the most advanced embodiment of this principle. Ultimately, and as part of the RTCA system, the VHF omniranges will have to be superseded by improved equipment. This is dictated by requirements of accuracy not met by the present equipment and by the necessity of consolidating all short distance navigational services for air traffic control in a single

radio frequency band. Such consolidation will effect simplification in the equipment to be carried by aircraft.

**Consolidated into Single Equipment.**—Indeed, the RTCA system consolidates into a single equipment all the services required for navigation and instrument landing, radiocommunication for traffic control, and a map-like picture which furnishes a double check to the pilot of his navigation and gives him a means to monitor the traffic situation and the movements of other aircraft in his vicinity. It is recognized that the smaller aircraft may not be able to carry the pictorial display.

The requirement that traffic control information be derived from ground equipment is readily met by a radar-type technique. It would here be desirable that the ground equipment provide not only R and Theta of the individual aircraft but also altitude and identity. Since present day radars do not provide the last two, it is necessary to install a transponder in the aircraft; this can be altitude coded and can also be operated to provide identity on request. With this equipment, the basic requirement that air traffic control information be derived from ground equipment is fulfilled. The ground equipment also operates from a single site.

Closed-circuit reliability is provided by furnishing both the pilot and the ground controller duplicate information independently. In order to transmit clearance to the airplane without cluttering up the oral communication lines, the system establishes a private line between ground and each individual airplane. Since not enough frequencies are available to give a separate one to each aircraft, a small group of frequencies are postulated; time sharing gives a specific channel to each individual plane. Arrangement is made to send a small number of clearances to the aircraft such as "proceed", "hold", "go left", "go right", "go up", "go down", and for the aircraft to transmit back to the ground a complete detailed acknowledgement. This channel can also be used for pilot requests and reports with interlock acknowledgement coming from the ground and for periodic reports of the navigational situation as seen on the pilot's instrument board. The comparison of the signals from the private line indicator in the aircraft with the situation on the pictorial display or the navigation instruments gives the pilot closed-circuit protection. A comparison between the position as determined by the ground radar and as reported over the private lines gives closed-circuit monitoring to the ground.

**Additional Requirements.**—An additional requirement to be met is the interlock requirement. This requires two functions to be fulfilled; one that the ground always monitor the plane's actions to make sure that the pilot has executed any clearances sent to him over the private line, the other is an interlocking of the ground equipment to prevent the issuance of hazardous clearances.

To keep the safety requirements of the system, a fail-safe airspace separation system similar in operation to a block control element is specified. This element overrides all other sources of traffic information and clearance to the aircraft so that it is impossible either for any automatic or manual system to send unsafe clearances to any aircraft.

Even with aircraft flown safely and with all the above requirements fulfilled, much is left to be desired. Separate studies made by independent agencies show that it is not expeditious to allow aircraft to arrive at crowded terminal area without previous sequencing and speed control. In the New York area under present conditions, deviations of as little as three minutes from an estimated arrival can cause serious delay. To attempt to land even 21 aircraft per hour per runway will result in an average delay of 18 minutes. Delays to some aircraft will be almost an hour.

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ning to insure runway availability at or near the projected arrival time by checking proposed flight paths against all those previously approved and by monitoring and re-sequencing of aircraft to achieve maximum utilization of runways. If this is properly done, almost all planes take up any necessary delays on the airway and make straight-in approaches and immediate landings. Control of arrival time by varying departure time, path length, and speed within reasonable limits imposes minimum strain on passengers or pilots in comparison to present day holding in a confined airspace.

**Flow Control.**—The flow control in a low traffic area can be established by occasional position reports from the aircraft to the controller, manual posting boards, and manual sequencing. In the most crowded areas, continual radar position determination, automatic monitoring, and resequencing of aircraft, where necessary, will be required. The major item of this latter system is a computer which receives reports from the radar system, desired flight plans from a flight-path-planning equipment, and information concerning weather, icing conditions and the like which might temporarily close off certain air lanes. Based on this information, the flow control system monitors the flight of all aircraft in its area to determine if the plane is, in fact, making good its desired flight path to ensure that any changes introduced into the flight path due to pilot error or change of weather, have not introduced hazardous conditions.

The final requirement expresses the acute need of careful system engineering rather than unplanned accumulation of gadgetry. With the wealth of ingenious systems which have been recently suggested, it would have been easy for agreement to have been reached by addition. This was not done. Only those elements were selected which are necessary and sufficient for the solution of the problem. Intervention in assembly was guarded against. The underlying techniques required in each of the components of the system are well known; considerable engineering development will be required to produce the practical applications of these techniques in working equipment. This portion of the program merits the highest priority.

**The Cost.**—The cost of the total system is estimated at \$1,113 million. Of this total, \$897 million is required for national defense which includes ground equipment and military airborne equipment. Requisite civil airborne installations are estimated at \$216 million. Included in the total cost are \$75.4 million for the development of equipments needed in the target system but which are not now at hand.

The proposed system represents not over 5 percent of the present investment in aviation in the United States. The increase in reliability obtainable under the proposed system will go far toward making aviation a self-sustaining industry.

The cost figures cited are based on the assumption of an orderly evolution from the present system through a period of integration to the target system. Any significant deviation from this plan will almost certainly result in these estimates being seriously exceeded.

To assure that continuity is maintained in implementing the RTCA program for an all-weather air traffic control system, it is recommended that a permanent Air Traffic Control and Navigation Steering Committee be established, to include representation from all users of the airspace.

**Program Requires 15 Years.**—The program requires some fifteen years for complete development, installation, and training of operators. Meanwhile, it is essential that something be done to relieve the present congested condition of the airways in the interest of national defense. Furthermore, the present rate of loss of aircraft and the present irregularity of flight dampen the desire of the American people to fly.

To overcome this condition, an immediate interim

## Civil Aviation Highlights

	1948	1947
Airports recorded with CAA, April 1	5,906	4,729
By type:		
Commercial	2,919	2,122
Municipal	1,856	1,484
CAA intermediate	168	200
Military	447	760
All others	516	163
Civil Airports by Class:		
Class I and under	3,666	2,611
Class II	859	715
Class III	432	339
Class IV and over	502	304
Scheduled air-carrier aircraft, April 1	979	846
Civil aircraft production, February	466	1,914
2-place models	220	793
3 and 4-place models	228	1,109
Over 4-place models	18	12
Certificates approved, February:		
Student pilots	10,191	12,881
Private pilots	6,263	6,692
Commercial pilots	437	433
Airline transport pilots	65	181
Mechanics (original certificates)	745	1,249
Ground instructors (original certificates)	200	273
Flight instructor ratings	186	492
Instrument ratings	105	280
Traffic control activity, February:		
Aircraft operations at CAA-operated airport towers	1,174,451	1,014,869
Fixed postings at CAA airway centers	794,240	690,863
Washington National Airport operations, March:		
Scheduled air carrier:		
Passengers departing	44,074	47,153
Passengers arriving	44,375	40,478
Aircraft arrivals and departures	8,750	8,342
Aircraft arrivals and departures other than scheduled air carrier	3,317	4,837
San Francisco Municipal Airport operations, February:		
Scheduled air carrier:		
Passengers departing	25,553	25,907
Passengers arriving	28,325	25,404
Aircraft arrivals and departures	5,646	3,884
Aircraft arrivals and departures other than scheduled air carrier	4,406	6,939
Oakland Municipal Airport operations, February:		
Scheduled air carrier:		
Passengers departing	3,688	3,586
Passengers arriving	5,375	3,145
Aircraft arrivals and departures	2,797	2,280
Aircraft arrivals and departures other than scheduled air carrier	15,602	12,446

<sup>1</sup> For airport type definitions see "Civil Aviation Highlights," Civil Aeronautics Journal, March 15, 1948.

program is proposed to be completely installed and operating within a five-year period. This comprises a low cost, lightweight VHF receiver to permit use of static-free voice channels and omni-directional range navigation on small aircraft. Additional ILS and GCA installations are required. The completion of the testing and production of distance measuring equipments and course computers is required so that aircraft can navigate with assurance. The completion of a radar cover of the more crowded traffic areas and the installation of airborne transponders in all aircraft capable of planned instrument flight are important portions of the interim program. The RTCA program utilizes the existing air navigation and traffic control facilities in the interim period.

A VHF automatic direction finder equipment at airports is recommended and also a simple mechanical interlock board to assist harassed traffic controllers and tower operators. Of these, the only equipment which cannot be integrated into the final target system is the VHF automatic direction finder and even this equipment may well prove useful in the lower density areas on the edge of the radar network.

**Interim Program Cost.**—The cost of this interim

program is estimated to be \$375.2 millions, of which only two percent is for completion of the development of these equipments, most of which are now at least in the model stage.

In compiling the estimates of cost and time required to complete the programs, it was found that the time and monies required could be substantially decreased if development contracts could be permitted to run for a period of five years instead of the present two-year limitation. Many contracts could be best handled by negotiation. Commercial interest could be sustained in complicated development obligations if a sustaining production is assured.

A comparison of the complete requirements for air traffic control and navigation, using both available and proposed facilities, shows:

Present facilities provide a factor of merit of 42 percent; the facilities of the interim program will provide a factor of merit of 67 percent; full implementation of the RTCA system will provide a factor of merit of 95 percent.

Time for the full implementation of the RTCA system could be reduced materially by revision of present contractual policies.



## Regulations

Amdt. 04b-9-----Effective May 19, 1948

**Section 04b.603** of the Civil Air Regulations establishes the minimum flight crew as that number of persons necessary for safe operation during day contact flight. This regulation does not specifically refer to the Administrator as the determining authority. Moreover, the determination of a minimum basic crew is limited to that required for day contact operations. In order to clarify the original intent of this regulation it is proposed to revise the wording so as specifically to point out that the Administrator would be the determining authority. In addition, since it is obvious that modern aircraft certificated under the transport category requirements of Part 04b are not intended either by the manufacturer or user to be used solely for day contact operations, it is desirable to require that the minimum crew be determined on the basis of what is required in the interest of safety for all operations authorized.

In consideration of the foregoing the Civil Aeronautics Board hereby amends Part 04b of the Civil Air Regulations by amending § 04b.603 to read as follows:

**§ 04b.603 Minimum flight crew.** The minimum flight crew shall be established by the Administrator as that number of persons which he finds necessary for safety in the operations authorized under § 04b.604. This finding shall be based upon the work load imposed upon individual crew members with due consideration given to the accessibility and the ease of operation of all necessary controls by the appropriate crew members.

Amdt. 41-17-----Effective May 1, 1948

**Section 41.24** of the Civil Air Regulations requires that after June 30, 1948, all aircraft operated in scheduled air transportation shall be equipped with flight recorders.

The purpose of this amendment is to permit scheduled air carriers to operate aircraft of less than 10,000 pounds maximum authorized take-off weight in passenger and cargo service without installing flight recorders.

Investigation has shown that the construction of aircraft of less than 10,000 pounds maximum authorized take-off weight does not provide adequate protection for this delicate equipment in the event of a severe crash. The weight penalty on the smaller aircraft in relation to the useful load is more severe than on the larger types of transport aircraft. The majority of lighter aircraft are used in day VFR operations and generally are flown for short distances at low altitudes. The value of a flight recorder in the investigation of accidents involving these aircraft is not significant.

In consideration of the foregoing the Civil Aeronautics Board hereby amends Part 41 of the Civil Air Regulations by amending § 41.24 to read as follows:

**41.24 Flight recorder.** No aircraft of 10,000 pounds or more maximum authorized take-off weight shall be operated in scheduled air transportation after June 30, 1948, unless it is equipped with instrumentation to record continuously during flight the altitude of the aircraft and the vertical accelerations to which the aircraft may be subjected, the values of both these items to be recorded against a time scale of at least 2 inches to the hour. The recording device shall be substantially protected from jarring and from the effects of fire and shall be located as far back in the fuselage as practicable, in any case at least aft of the most rearward bulkhead.

Amdt. 41-18-----Effective May 1, 1948

In September 1946 the Civil Aeronautics Board adopted amendments of Parts 04a, 04b, 41, 42, and 61 of the Civil Air Regulations relating to fire prevention which required modifications of all new transport category airplanes and of all other airplanes used in passenger air carrier service utilizing engines rated at more than 600 hp (each) for maximum continuous operation. These modifications were designed to eliminate insofar as possible the conditions which had become evident as being conducive to fire in flight. At the time of adoption of the amendments, the Board, after consultations with the affected portions of the aviation industry, established January 1, 1948, as the date for full compliance with these regulations.

Shortly after adopting the fire prevention amendments it became apparent that full compliance by some operators might be delayed due to the extensive preparatory studies necessary to accomplish the required engineering changes and because of shortages of necessary parts. In order to lessen the burden imposed upon the air carriers by the new regulations, the Board adopted Special Civil Air Regulations Serial Numbers 385, 390, 390-A, and 390-B which made the time of compliance more flexible and which extended the ultimate date of compliance until May 1, 1948.

Although a great majority of airplanes in scheduled service and some airplanes in nonscheduled service will be modified as required by May 1, 1948, it now appears that there will be some airplanes which will not be fully modified by that date. The Board has considered the action taken by the operators to comply with the pertinent regulations and finds that in general the operators have made a conscientious effort to obtain the necessary parts and to perform the required modifications on time. However, in many instances sufficient parts were not available, and the operators were, therefore, delayed in their efforts to meet the effective date for full compliance.

The Civil Aeronautics Board finds that at least one certificated air carrier and several irregular air carriers have not been able to secure all of the items needed to complete the modifications required by the amendments previously referred to, and that failure to extend the date for full compliance with these regulations would seriously interfere with air transportation. For this reason the Board considers it in the public interest to authorize an additional period of six months, but it contemplates no further extension beyond that time.

In order to simplify the outstanding regulations on this matter, the Board is revoking Special Civil Air Regulations Serial Numbers 385, 390, 390-A, and 390-B and is incorporating the pertinent parts of the regulations in this amendment.

In consideration of the foregoing the Civil Aeronautics Board hereby 1. Amends Part 41 of the Civil Air Regulations:

(a) By amending subparagraphs 41.20 (f) (2) and (3) by substituting the date "November 1, 1948" for "May 1, 1948."

(b) By adding the following proviso at the end of the first paragraph of § 41.20 (f) following the word "regulations":

"Provided, That compliance with the provisions of this section shall not be required in those instances where the air carrier notifies the Administrator and shows that there exists a lack of equipment or parts necessary for compliance with specific provisions contained in this section. However, when such equipment or parts become available the air carrier shall comply with the pertinent provisions as soon thereafter as practicable. This proviso and the privileges granted thereby shall not be effective after November 1, 1948."

2. Revokes Special Civil Air Regulations Serial Numbers 385, 390, 390-A, and 390-B.

Amdt. 41-19-----Effective May 19, 1948

The Civil Aeronautics Board on October 6, 7, and 8, 1947, conducted a public hearing on the question of whether, and under what circumstances and conditions, if any, additional flight crew complement should be required on air carrier aircraft. Upon due consideration of the evidence presented the Board has determined that certain changes in the present requirements of the regulations affecting scheduled foreign and overseas air carrier aircraft are desirable. These changes will be treated separately with respect to the particular airman involved.

**A. Flight Engineer**—Part 41 presently requires flight engineers when "the design of the aircraft used or the type of operation is such as to require engineer personnel." In the light of present operating circumstances it appears desirable to promulgate additional specifications to more clearly define the circumstances under which a flight engineer should be required. In the hearing above referred to, extensive testimony was presented to the Board with respect to the desirability of a flight engineer on various aircraft, such as the Douglas DC-6, the Boeing 377, and the Douglas DC-4. As a result of this testimony the Board has concluded that the multiplicity of instrumentation and complexity of operational controls on certain of these aircraft limit the pilot's ability to focus his attention on all of the critical instruments and controls. It is believed that a competent flight engineer, by assuming certain mechanical duties, will enable the pilot to concentrate his attention on the actual flight of the aircraft, radio operation, and receipt of traffic control clearances particularly during instrument conditions where this is imperative. The Board considers that a flight engineer is required on aircraft of the size and complexity of the Douglas DC-6 and the Boeing 377. Under certain operating conditions, such as some extended over water flights, the safe operation of the Douglas DC-4 may require the assignment of a flight engineer. Therefore, the regulation herein established will require flight engineers on aircraft such as the Boeing 377 and Douglas DC-6, and will permit the Administrator to require flight engineers on other aircraft including the DC-4 where such airman are essential for safe operation. The Board is cognizant that compliance with this amendment may require the training of additional personnel and for this reason has established the date of December 1, 1948 as being sufficiently advanced to constitute a firm compliance date.

**B. Flight Navigator**—Part 41 presently requires a crew member holding a flight navigator certificate in all operations where "celestial navigation is necessary, either as a primary or secondary means of navigation." In view of the varying interpretations of this requirement, it is deemed desirable to establish more specific requirements for full time flight navigators. Current changes in navigational aids and the constant improvement in the quantity, usage, and efficiency of such aids require flexibility in any rule governing the assignment of flight navigators. For this reason, the Administrator, who has all of the information relative to the navigational aids available for use on a particular route or segment thereof, should continue to make the determination as to when a flight navigator is required based upon the necessity for the use of celestial navigation or such other specialized means of navigation as cannot adequately be accomplished from the pilot's station.

**C. Flight Radio Operator**—Part 41 presently requires a flight radio operator "when radiotelephony is used for communication with ground stations during flight." In view of the varying interpretations of this requirement, the Board feels it desirable to provide more specifically that where radiotelephony is necessary the sole duty of an airman shall be that of a flight radio operator, and that such operator shall be required over that segment of the route for which radiotelephony is necessary for communication with ground stations.

In order to adequately determine the full required crew complement this amendment also provides that the Administrator shall make such determination by applying the established standards on proving flights to be conducted by the carrier under his direction. Where proving flights have already been accomplished the Administrator shall make this determination upon a review thereof, taking in to account the latest information available. Where such review is inconclusive, the Administrator may make such additional investigation as is necessary.

In consideration of the foregoing the Civil Aeronautics Board hereby amends Part 41 of the Civil Air Regulations 1. By adding a new § 41.309 to read as follows:

**41.309 Composition of flight crew.** The minimum flight crew shall be determined by the Administrator on the proving flights by applying the standards hereinafter prescribed for each route or segment thereof to be flown. Where such flights already have been accomplished, the Administrator shall make the determination by review of the proving flights and such other inspection as he finds necessary. The kind and number of crew members thus determined shall be specified in the air carrier operating certificate.

2. By amending § 41.310 to read as follows: **41.310 When required.** An airman holding a flight radio operator certificate shall be required solely for communication for that route or segment thereof over which the Administrator has determined that radio telephony is necessary for communication with ground stations during flight.

3. By amending § 41.320 to read as follows: **41.320 When required.** After December 1, 1948, an airman holding a flight engineer certificate shall be required solely as a flight engineer on all aircraft certificated for more than 80,000 pounds maximum take-off weight, and on all other aircraft certificated for more than 30,000 pounds maximum take-off weight where the Administrator has found that the design of the aircraft used or the type

of operation is such as to require engineer personnel for the safe operation of the aircraft.

4. By amending § 41.330 to read as follows: **41.330 When required.** An airman holding a flight navigator certificate shall be required solely for navigation for that route or segment thereof for which the Administrator has determined that: (a) celestial navigation is necessary, or (b) other specialized means of navigation necessary for the safe conduct of flight cannot be adequately accomplished from the pilot station.

Amdt. 41-20-----Effective May 20, 1948

The present Civil Air Regulations do not require all air carrier operators to provide and maintain cockpit check lists and procedures for all aircraft operated in air transportation.

The purpose of this amendment is to require the maintenance of cockpit check lists for the operation involved in a readily accessible location in the pilot compartment of each aircraft. These check lists will set forth the procedures to be followed by the flight crew for a particular make and model aircraft prior to starting engines, prior to take-off, prior to landing, and for powerplant emergencies.

In consideration of the foregoing, the Civil Aeronautics Board hereby amends Part 41 of the Civil Air Regulations by adding a new § 41.29 to read as follows:

**41.29 Cockpit check list.** (a) The air carrier shall provide for each make and model aircraft a cockpit check list, approved by the Administrator, adapted to each operation in which the aircraft is to be utilized. An approved check list shall be installed in a readily accessible location in the cockpit of each aircraft and shall be appropriately used by the flight crew for each flight.

(b) The cockpit check list shall include procedures prior to starting engines, prior to take-off, prior to landing, and for powerplant emergencies.

Amdt. 42-8-----Effective May 1, 1948

(Note: The explanatory material given under Amdt. 41-18 applies to this Amdt.)

The Civil Aeronautics Board hereby amends Part 42 of the Civil Air Regulations 1. By amending paragraphs 42.10 (b) and (c) by substituting the date "November 1, 1948" for "May 1, 1948."

2. By adding the following proviso at the end of the second paragraph of § 42.10 following the word "regulations":

"Provided, That compliance with the provisions of this section shall not be required in those instances where the air carrier notifies the Administrator and shows that there exists a lack of equipment or parts necessary for compliance with specific provisions contained in this section. However, when such equipment or parts become available the air carrier shall comply with the pertinent provisions as soon thereafter as practicable. This proviso and the privileges granted thereby shall not be effective after November 1, 1948."

Amdt. 42-9-----Effective May 20, 1948

(Note: The explanatory material given under Amdt. 40-20 applies to this Amdt.)

The Civil Aeronautics Board hereby amends Part 42 of the Civil Air Regulations by amending § 42.14 to read as follows:

**42.14 Cockpit check list.** (a) The air carrier shall provide for each make and model aircraft a cockpit check list, approved by the Administrator, adapted to each operation in which the aircraft is to be utilized. An approved check list shall be installed in a readily accessible location in the cockpit of each aircraft and shall be appropriately used by the flight crew for each flight.

(b) The cockpit check list shall include procedures prior to starting engines, prior to take-off, prior to landing, and for powerplant emergencies.

Amdt. 61-14-----Effective May 1, 1948

Section 61.7804 requires that a radiotelephone headset shall be worn by the first pilot or by a second pilot and the radio tuned to appropriate frequencies at least during the time while the aircraft is in flight or taxiing.

Loud speakers for cockpit use have recently been developed and tested successfully in connection with aircraft radio equipment. It appears that a loud speaker installation offers several advantages over the conventional headset now in use, and the Civil Air Regulations should be amended to permit the use of the loud speaker installation. Other parts of the Civil Air Regulations apply prescribe for the proper use of aircraft radio systems.

In consideration of the foregoing the Civil Aeronautics Board hereby amends Part 61 of the Civil Air Regulations by repealing § 61.7804 thereof.

Amdt. 61-15-----Effective May 1, 1948

(Note: The explanatory material given under Amdt. 41-17 applies to this Amdt.)

The Civil Aeronautics Board hereby amends Part 61 of the Civil Air Regulations by amending § 61.341 to read as follows:

**61.341 Flight recorder.** No aircraft of 10,000 pounds or more maximum authorized take-off weight shall be operated in scheduled air transportation after June 30, 1948, unless it is equipped with instrumentation to record continuously during flight the altitude of the aircraft and the vertical accelerations to which the aircraft may be subjected, the values of both these items to be recorded against a time scale of at least 2 inches to the hour. The recording device shall be substantially protected from jarring and from the effects of fire and shall be located as far back in the fuselage as practicable, in any case at least aft of the most rearward bulkhead.

Amdt. 61-16-----Effective May 1, 1948

(Note: The explanatory material given under Amdt. 41-18 applies to this Amdt.)

The Civil Aeronautics Board hereby amends Part 61 of the Civil Air Regulations 1. By amending paragraphs 61.30 (b) and

(c) by substituting the date "November 1, 1948" for "May 1, 1948."

2. By adding the following proviso at the end of the second paragraph of § 61.30 following the word "regulations":

"Provided, That compliance with the provisions of this section shall not be required in those instances where the air carrier notifies the Administrator and shows that there exists a lack of equipment or parts necessary for compliance with specific provisions contained in this section. However, when such equipment or parts become available the air carrier shall comply with the pertinent provisions as soon thereafter as practicable. This proviso and the privileges granted thereby shall not be effective after November 1, 1948."

Amdt. 61-17-----Effective May 1, 1948

(Note: The explanatory material given under Amdt. 41-18 applies to this Amdt.)

The Civil Aeronautics Board hereby amends Part 61 of the Civil Air Regulations 1. By amending paragraphs 61.30 (b) and (c) by substituting the date "November 1, 1948" for "May 1, 1948."

2. By adding the following proviso at the end of the second paragraph of § 61.30 following the word "regulations":

"Provided, That compliance with the provisions of this section shall not be required in those instances where the air carrier notifies the Administrator and shows that there exists a lack of equipment or parts necessary for compliance with specific provisions contained in this section. However, when such equipment or parts become available the air carrier shall comply with the pertinent provisions as soon thereafter as practicable. This proviso and the privileges granted thereby shall not be effective after November 1, 1948."

Amdt. 61-18-----Effective May 1, 1948

(Note: The explanatory material given under Amdt. 41-18 applies to this Amdt.)

The Civil Aeronautics Board hereby amends Part 61 of the Civil Air Regulations 1. By amending paragraphs 61.30 (b) and (c) by substituting the date "November 1, 1948" for "May 1, 1948."

2. By adding the following proviso at the end of the second paragraph of § 61.30 following the word "regulations":

"Provided, That compliance with the provisions of this section shall not be required in those instances where the air carrier notifies the Administrator and shows that there exists a lack of equipment or parts necessary for compliance with specific provisions contained in this section. However, when such equipment or parts become available the air carrier shall comply with the pertinent provisions as soon thereafter as practicable. This proviso and the privileges granted thereby shall not be effective after November 1, 1948."

Amdt. 61-19-----Effective May 1, 1948

(Note: The explanatory material given under Amdt. 41-18 applies to this Amdt.)

The Civil Aeronautics Board hereby amends Part 61 of the Civil Air Regulations 1. By amending paragraphs 61.30 (b) and (c) by substituting the date "November 1, 1948" for "May 1, 1948."

2. By adding the following proviso at the end of the second paragraph of § 61.30 following the word "regulations":

"Provided, That compliance with the provisions of this section shall not be required in those instances where the air carrier notifies the Administrator and shows that there exists a lack of equipment or parts necessary for compliance with specific provisions contained in this section. However, when such equipment or parts become available the air carrier shall comply with the pertinent provisions as soon thereafter as practicable. This proviso and the privileges granted thereby shall not be effective after November 1, 1948."

Amdt. 61-20-----Effective May 1, 1948

(Note: The explanatory material given under Amdt. 41-18 applies to this Amdt.)

The Civil Aeronautics Board hereby amends Part 61 of the Civil Air Regulations 1. By amending paragraphs 61.30 (b) and (c) by substituting the date "November 1, 1948" for "May 1, 1948."

2. By adding the following proviso at the end of the second paragraph of § 61.30 following the word "regulations":

"Provided, That compliance with the provisions of this section shall not be required in those instances where the air carrier notifies the Administrator and shows that there exists a lack of equipment or parts necessary for compliance with specific provisions contained in this section. However, when such equipment or parts become available the air carrier shall comply with the pertinent provisions as soon thereafter as practicable. This proviso and the privileges granted thereby shall not be effective after November 1, 1948."

Amdt. 61-21-----Effective May 1, 1948

(Note: The explanatory material given under Amdt. 41-18 applies to this Amdt.)

The Civil Aeronautics Board hereby amends Part 61 of the Civil Air Regulations 1. By amending paragraphs 61.30 (b) and (c) by substituting the date "November 1, 1948" for "May 1, 1948."

2. By adding the following proviso at the end of the second paragraph of § 61.30 following the word "regulations":

"Provided, That compliance with the provisions of this section shall not be required in those instances where the air carrier notifies the Administrator and shows that there exists a lack of equipment or parts necessary for compliance with specific provisions contained in this section. However, when such equipment or parts become available the air carrier shall comply with the pertinent provisions as soon thereafter as practicable. This proviso and the privileges granted thereby shall not be effective after November 1, 1948."

Amdt. 61-22-----Effective May 1, 1948

(Note: The explanatory material given under Amdt. 41-18 applies to this Amdt.)

The Civil Aeronautics Board hereby amends Part 61 of the Civil Air Regulations 1. By amending paragraphs 61.30 (b) and (c) by substituting the date "November 1, 1948" for "May 1, 1948."

2. By adding the following proviso at the end of the second paragraph of § 61.30 following the word "regulations":

"Provided, That compliance with the provisions of this section shall not be required in those instances where the air carrier notifies the Administrator and shows that there exists a lack of equipment or parts necessary for compliance with specific provisions contained in this section. However, when such equipment or parts become available the air carrier shall comply with the pertinent provisions as soon thereafter as practicable. This proviso and the privileges granted thereby shall not be effective after November 1, 1948."

Amdt. 61-23-----Effective May 1, 1948

(Note: The explanatory material given under Amdt. 41-18 applies to this Amdt.)

The Civil Aeronautics Board hereby amends Part 61 of the Civil Air Regulations 1. By amending paragraphs 61.30 (b) and (c) by substituting the date "November 1, 1948" for "May 1, 1948."

2. By adding the following proviso at the end of the second paragraph of § 61.30 following the word "regulations":

"Provided, That compliance with the provisions of this section shall not be required in those instances where the air carrier notifies the Administrator and shows that there exists a lack of equipment or parts necessary for compliance with specific provisions contained in this section. However, when such equipment or parts become available the air carrier shall comply with the pertinent provisions as soon thereafter as practicable. This proviso and the privileges granted thereby shall not be effective after November 1, 1948."

Amdt. 61-24-----Effective May 1, 1948

(Note: The explanatory material given under Amdt. 41-18 applies to this Amdt.)

The Civil Aeronautics Board hereby amends Part 61 of the Civil Air Regulations 1. By amending paragraphs 61.30 (b) and (c) by substituting the date "November 1, 1948" for "May 1, 1948."

2. By adding the following proviso at the end of the second paragraph of § 61.30 following the word "regulations":

"Provided, That compliance with the provisions of this section shall not be required in those instances where the air carrier notifies the Administrator and shows that there exists a lack of equipment or parts necessary for compliance with specific provisions contained in this section. However, when such equipment or parts become available the air carrier shall comply with the pertinent provisions as soon thereafter as practicable. This proviso and the privileges granted thereby shall not be effective after November 1, 1948."

Amdt. 61-25-----Effective May 1, 1948

(Note: The explanatory material given under Amdt. 41-18 applies to this Amdt.)

The Civil Aeronautics Board hereby amends Part 61 of the Civil Air Regulations 1. By amending paragraphs 61.30 (b) and (c) by substituting the date "November 1, 1948" for "May 1, 1948."

2. By adding the following proviso at the end of the second paragraph of § 61.30 following the word "regulations":

"Provided, That compliance with the provisions of this section shall not be required in those instances where the air carrier notifies the Administrator and shows that there exists a lack of equipment or parts necessary for compliance with specific provisions contained in this section. However, when such equipment or parts become available the air carrier shall comply with the pertinent provisions as soon thereafter as practicable. This proviso and the privileges granted thereby shall not be effective after November 1, 1948."

Amdt. 61-26-----Effective May 1, 1948

(Note: The explanatory material given under Amdt. 41-18 applies to this Amdt.)

The Civil Aeronautics Board hereby amends Part 61 of the Civil Air Regulations 1. By amending paragraphs 61.30 (b) and (c) by substituting the date "November 1, 1948" for "May 1, 1948."

2. By adding the following proviso at the end of the second paragraph of § 61.30 following the word "regulations":

"Provided, That compliance with the provisions of this section shall not be required in those instances where the air carrier notifies the Administrator and shows that there exists a lack of equipment or parts necessary for compliance with specific provisions contained in this section. However, when such equipment or parts become available the air carrier shall comply with the pertinent provisions as soon thereafter as practicable. This proviso and the privileges granted thereby shall not be effective after November 1, 1948."

Amdt. 61-27-----Effective May 1, 1948

(Note: The explanatory material given under Amdt. 41-18 applies to this Amdt.)

The Civil Aeronautics Board hereby amends Part 61 of the Civil Air Regulations 1. By amending paragraphs 61.30 (b) and (c) by substituting the date "November 1, 1948" for "May 1, 1948."

2. By adding the following proviso at the end of the second paragraph of § 61.30 following the word "regulations":

"Provided, That compliance with the provisions of this section shall not be required in those instances where the air carrier notifies the Administrator and shows that there exists a lack of equipment or parts necessary for compliance with specific provisions contained in this section. However, when such equipment or parts become available the air carrier shall comply with the pertinent provisions as soon thereafter as practicable. This proviso and the privileges granted thereby shall not be effective after November 1, 1948."

Amdt. 61-28-----Effective May 1, 1948

(Note: The explanatory material given under Amdt. 41-18 applies to this Amdt.)

The Civil Aeronautics Board hereby amends Part 61 of the Civil Air Regulations 1. By amending paragraphs 61.30 (b) and (c) by substituting the date "November 1, 1948" for "May 1, 1948."

2. By adding the following proviso at the end of the second paragraph of § 61.30 following the word "regulations":

"Provided, That compliance with the provisions of this section shall not be required in those instances where the air carrier notifies the Administrator and shows that there exists a lack of equipment or parts necessary for compliance with specific provisions contained in this section. However, when such equipment or parts become available the air carrier shall comply with the pertinent provisions as soon thereafter as practicable. This proviso and the privileges granted thereby shall not be effective after November 1, 1948."

Amdt. 61-29-----Effective May 1, 1948

(Note: The explanatory material given under Amdt. 41-18 applies to this Amdt.)

The Civil Aeronautics Board hereby amends Part 61 of the Civil Air Regulations 1. By amending paragraphs 61.30 (b) and (c) by substituting the date "November 1, 1948" for "May 1, 1948."

2. By adding the following proviso at the end of the second paragraph of § 61.30 following the word "regulations":

"Provided, That compliance with the provisions of this section shall not be required in those instances where the air carrier notifies the Administrator and shows that there exists a lack of equipment or parts necessary for compliance with specific provisions contained in this section. However, when such equipment or parts become available the air carrier shall comply with the pertinent provisions as soon thereafter as practicable. This proviso and the privileges granted thereby shall not be effective after November 1, 1948."

Amdt. 61-30-----Effective May 1, 1948

(Note: The explanatory material given under Amdt. 41-18 applies to this Amdt.)

The Civil Aeronautics Board hereby amends Part 61 of the Civil Air Regulations 1. By amending paragraphs 61.30 (b) and (c) by substituting the date "November 1, 1948" for "May 1, 1948."

2. By adding the following proviso at the end of the second paragraph of § 61.30 following the word "regulations":

"Provided, That compliance with the provisions of this section shall not be required in those instances where the air carrier notifies the Administrator and shows that there exists a lack of equipment or parts necessary for compliance with specific provisions contained in this section. However, when such equipment or parts become available the air carrier shall comply with the pertinent provisions as soon thereafter as practicable. This proviso and the privileges granted thereby shall not be effective after November 1, 1948."

Amdt. 61-31-----Effective May 1, 1948

(Note: The explanatory material given under Amdt. 41-18 applies to this Amdt.)

The Civil Aeronautics Board hereby amends Part 61 of the Civil Air Regulations 1. By amending paragraphs 61.30 (b) and (c) by substituting the date "November 1, 1948" for "May 1, 1948."

2. By adding the following proviso at the end of the second paragraph of § 61.30 following the word "regulations":

"Provided, That compliance with the provisions of this section shall not be required in those instances where the air carrier notifies the Administrator and shows that there exists a lack of equipment or parts necessary for compliance with specific provisions contained in this section. However, when such equipment or parts become available the air carrier shall comply with the pertinent provisions as soon thereafter as practicable. This proviso and the privileges granted thereby shall not be effective after November 1, 1948."

Amdt. 61-32-----Effective May 1, 1948

(Note: The explanatory material given under Amdt. 41-18 applies to this Amdt.)

The Civil Aeronautics Board hereby amends Part 61 of the Civil Air Regulations 1. By amending paragraphs 61.30 (b) and (c) by substituting the date "November 1, 1948" for "May 1, 1948."

2. By adding the following proviso at the end of the second paragraph of § 61.30 following the word "regulations":

"Provided, That compliance with the provisions of this section shall not be required in those instances where the air carrier notifies the Administrator and shows that there exists a lack of equipment or parts necessary for compliance with specific provisions contained in this section. However, when such equipment or parts become available the air carrier shall comply with the pertinent provisions as soon thereafter as practicable. This proviso and the privileges granted thereby shall not be effective after November 1, 1948."

Amdt. 61-33-----Effective May 1, 1948

(Note: The explanatory material given under Amdt. 41-18 applies to this Amdt.)

The Civil Aeronautics Board hereby amends Part 61 of the Civil Air Regulations 1. By amending paragraphs 61.30 (b) and (c) by substituting the date "November 1, 1948" for "May 1, 1948."

2. By adding the following proviso at the end of the second paragraph of § 61.30 following the word "regulations":

"Provided, That compliance with the provisions of this section shall not be required in those instances where the air carrier notifies the Administrator and shows that there exists a lack of equipment or parts necessary for compliance with specific provisions contained in this section. However, when such equipment or parts become available the air carrier shall comply with the pertinent provisions as soon thereafter as practicable. This proviso and the privileges granted thereby shall not be effective after November 1, 1948."

Amdt. 61-34-----Effective May 1, 1948

(Note: The explanatory material given under Amdt. 41-18 applies to this Amdt.)

The Civil Aeronautics Board hereby amends Part 61 of the Civil Air Regulations 1. By amending paragraphs 61.30 (b) and (c) by substituting the date "November 1, 1948" for "May 1, 1948."

2. By adding the following proviso at the end of the second paragraph of § 61.30 following the word "regulations":

"Provided, That compliance with the provisions of this section shall not be required in those instances where the air carrier notifies the Administrator and shows that there exists a lack of equipment or parts necessary for compliance with specific provisions contained in this section. However, when such equipment or parts become available the air carrier shall comply with the pertinent provisions as soon thereafter as practicable. This proviso and the privileges granted thereby shall not be effective after November 1, 1948."

Amdt. 61-35-----Effective May 1, 1948

(Note: The explanatory material given under Amdt. 41-18 applies to this Amdt.)

The Civil Aeronautics Board hereby amends Part 61 of the Civil Air Regulations 1. By amending paragraphs 61.30 (b) and (c) by substituting the date "November 1, 1948" for "May 1, 1948."

2. By adding the following proviso at the end of the second paragraph of § 61.30 following the word "regulations":

"Provided, That compliance with the provisions of this section shall not be required in those instances where the air carrier notifies the Administrator and shows that there exists a lack of equipment or parts necessary for compliance with specific provisions contained in this section. However, when such equipment or parts become available the air carrier shall comply with the pertinent provisions as soon thereafter as practicable. This proviso and the privileges granted thereby shall not be effective after November 1, 1948."

Amdt. 61-36-----Effective May 1, 1948

(Note: The explanatory material given under Amdt. 41-18 applies to this Amdt.)

The Civil Aeronautics Board hereby amends Part 61 of the Civil Air Regulations 1. By amending paragraphs 61.30 (b) and (c) by substituting the date "November 1, 1948" for "May 1, 1948."

2. By adding the following proviso at the end of the second paragraph of § 61.30 following the word "regulations":

"Provided, That compliance with the provisions of this section shall not be required in those instances where the air carrier notifies the Administrator and shows that there exists a lack of equipment or parts necessary for compliance with specific provisions contained in this section. However, when such equipment or parts become available the air carrier shall comply with the pertinent provisions as soon thereafter as practicable. This proviso and the privileges granted thereby shall not be effective after November 1, 1948."

Amdt. 61-37-----Effective May 1, 1948

(Note: The explanatory material given under Amdt. 41-18 applies to this Amdt.)

The Civil Aeronautics Board hereby amends Part 61 of the Civil Air Regulations 1. By amending paragraphs 61.30 (b) and (c) by substituting the date "November 1, 1948" for "May 1, 1948."

2. By adding the following proviso at the end of the second paragraph of § 61.30 following the word "regulations":

"Provided, That compliance with the provisions of this section shall not be required in those instances where the air carrier notifies the Administrator and shows that there exists a lack of equipment or parts necessary for compliance with specific provisions contained in this section. However, when such equipment or parts become available the air carrier shall comply with the pertinent provisions as soon thereafter as practicable. This proviso and the privileges granted thereby shall not be effective after November 1, 1948."

Amdt. 61-38-----Effective May 1, 1948

(Note: The explanatory material given under Amdt. 41-18 applies to this Amdt.)

The Civil Aeronautics Board hereby amends Part 61 of the Civil Air Regulations 1. By amending paragraphs 61.30 (b) and (c) by substituting the date "November 1, 1948" for "May 1, 1948."

2. By adding the following proviso at the end of the second paragraph of § 61.30 following the word "regulations":

"Provided, That compliance with the provisions of this section shall not be required in those instances where the air carrier notifies the Administrator and shows that there exists a lack of equipment or parts necessary for compliance with specific provisions contained in this section. However, when such equipment or parts become available the air carrier shall comply with the pertinent provisions as soon thereafter as practicable. This proviso and the privileges granted thereby shall not be effective after November 1, 1948."

Amdt. 61-39-----Effective May 1, 1948

(Note: The explanatory material given under Amdt. 41-18 applies to this Amdt.)

The Civil Aeronautics Board hereby amends Part 61 of the Civil Air Regulations 1. By amending paragraphs 61.30 (b) and (c) by substituting the date "November 1, 1948" for "May 1, 1948."

2. By adding the following proviso at the end of the second paragraph of § 61.30 following the word "regulations":



(c) by substituting the date "November 1, 1948" for "May 1, 1948."

2. By adding the following proviso at the end of the second paragraph of § 61.30 following the word "regulations":

"Provided, That compliance with the provisions of this section shall not be required in those instances where the air carrier notifies the Administrator and shows that there exists a lack of equipment or parts necessary for compliance with specific provisions contained in this section. However, when such equipment or parts become available the air carrier shall comply with the pertinent provisions as soon thereafter as practicable. This proviso and the privileges granted thereby shall not be effective after November 1, 1948."

Amdt. 61-17-----Effective May 19, 1948

(Note: The explanatory material given under Amdt. 41-19 applies, for the most part, to this Amdt.)

The Civil Aeronautics Board hereby amends Part 61 of the Civil Air Regulations by amending § 61.56 to read as follows:

**61.56 Flight engineer--when required.** After December 1, 1948, an airman holding a flight engineer certificate shall be required solely as a flight engineer on all aircraft certificated for more than 80,000 pounds maximum take-off weight, and on all other aircraft certificated for more than 30,000 pounds maximum take-off weight where the Administrator has found that the design of the aircraft used or the type of operation is such as to require engineer personnel for the safe operation of the aircraft.

Amdt. 61-18-----Effective May 20, 1948

(Note: The explanatory material given under Amdt. 41-20 applies to this Amdt.)

The Civil Aeronautics Board hereby amends Part 61 of the Civil Air Regulations by adding a new § 61.343 to read as follows:

**61.343 Cockpit check list.** (a) The air carrier shall provide for each make and model aircraft a cockpit check list, approved by the Administrator, adapted to each operation in which the aircraft is to be utilized. An approved check list shall be installed in a readily accessible location in the cockpit of each aircraft and shall be appropriately used by the flight crew for each flight.

(b) The cockpit check list shall include procedures prior to starting engines, prior to take-off, prior to landing, and for powerplant emergencies.

### Suspensions

SD-707 suspends for 9 months any pilot certificate held by Fred S. Burris for failing to conform to the flow of traffic while taxiing and taking off from the Marysville, Kans., Municipal Airport (January 14).

SD-711 suspends for 60 days, private certificate with airplane single-engine land rating of Robert F. Bourque for starting the engine of an aircraft without having an operator at the controls, thereby operating an aircraft in a careless manner (February 7).

SD-712 suspends for 60 days, commercial pilot certificate with airplane multi-engine land rating of James B. Murray for low flying over a congested area of Sycamore, Ill. (February 6).

SD-713 suspends for 60 days, commercial certificate of Glen O. Kidwell for performing sharp dives and steep pull-ups and other unnecessary maneuvers near Kirksville, Ill. (February 7).

SD-715 suspends for 6 months, commercial certificate of Edw. J. Durbiano because he referred to notes while taking a written exam for an instrument rating (January 27).

SD-718 suspends for 60 days, private certificate and airplane single-engine land ratings of Ernest J. Straub for low flying, while carrying a passenger, over a congested area of Kansas City, Mo. (February 14).

SD-720 suspends for 15 days, commercial pilot certificate with airplane single-engine land and flight instructor's rating of Robert S. Sorrell for executing spins over and in the vicinity of Lake Decatur, Decatur, Ill., when neither he nor his passenger were equipped with parachutes (February 24).

SD-722 suspends for 90 days, student certificate of John F. Clark for piloting an aircraft outside the local flying area designated by his flight instructor (February 11).

SD-723 suspends for 60 days, commercial certificate of Roy W. Milligan for low flying over the congested business and residential area of Miles City, Mont. (February 26).

SD-724 suspends for 60 days, any airman certificate held by Maitland L. Haag, and thereafter until he passes written exams required for the original issuance of a private pilot rating, for operating an aircraft in a control area contrary to traffic control instructions (January 19).

SD-725 suspends for 6 months, private certificate with single-engine land rating of Wm. R. Phifer for low flying in the vicinity of Polkton, N. C. (February 12).

SD-727 suspends for 4 months, private certificate with airplane single-engine land rating of Donald E. Brown for flying over the town of Odin, Ill., at about 75 feet (February 16).

SD-728 suspends for 10 days, private certificate of Wesley W. Herboldsheim for executing a right-hand turn in the traffic pattern while approaching for a landing at an airport known as Novotney Air Strip when such a turn had not been authorized by a control tower (January 20).

SD-730 suspends for 2 weeks, airline transport certificate of Leonard H. Smith because, while in command of a flight, he permitted the aircraft to descend to an altitude less than 350 feet above the ground over and in the vicinity of the airport at Cheyenne, Wyo. (February 14).

SD-731 suspends for 6 months, commercial certificate with airplane single-engine land and sea ratings of Jos. E. Baughman for low flying in the vicinity of a bathing beach on Lake Storey, Galesburg, Ill. (February 17).

SD-734 suspends for 60 days, private certificate of C. J. Kirkendall for starting an aircraft not equipped with brakes, with no checks under the wheels and no competent operator at the controls (February 5).

SD-735 suspends for 6 months, student certificate of Charles C. Council for low flying over the main business district of Newton, N. J. (February 6).

SD-736 suspends for 9 months, private certificate of W. F. Moore for low flying over an open-air assembly of persons at Wilmette Beach, Wilmette, Ill. (February 27).

SD-739 suspends for 90 days, student certificate of Robert L. Clark for low flying over Arkansas Lane in Arlington, Tex. (February 10).

## Air Regulations . on May 1, 1948

TITLE	No.	PART			MANUAL		
		Price	Date	No. of Amendments	Price	Date	No. of Amendments
Aircraft							
Airworthiness Certificates.....	01	\$0.05	10/15/42	3	None	None	
Type and Production Certificates.....	02	.05	7/1/46	1	\$0.10	8/1/46	
Airplane Airworthiness—Normal, Utility, Aerobatic, and Restricted Purpose Categories.....	03	.25	12/15/46	3	None	None	
Airplane Airworthiness.....	04a	.25	11/1/47	1	.75	7/1/44	
Airplane Airworthiness Transport Categories.....	04b	Free	11/9/45	9	None	None	
Rotorcraft Airworthiness.....	06	.10	5/24/46	1	None	None	
Aircraft Airworthiness, Limited Category.....	09	.05	11/21/46	1	None	None	
Engine Airworthiness.....	13	.05	8/1/41	1	None	None	
Propeller Airworthiness.....	14	.05	7/15/42	1	.15	5/1/46	
Equipment Airworthiness.....	15	.05	5/31/46	1	None	None	
Radio Equipment Airworthiness.....	16	.05	2/13/41	1	Free	2/13/41	
Maintenance, Repair, and Alteration of Aircraft, Engines, Propellers, Instruments.....	18	.05	9/1/42	1	.60	6/1/43	
Airmen							
Pilot Certificates.....	20	.05	7/1/45	8	None	None	
Airline Pilot Rating.....	21	.05	10/1/42	4	None	None	
Lighter-than-air Pilot Certificates.....	22	.05	10/15/42	2	None	None	
Mechanic Certificates.....	24	.05	7/1/43	2	None	None	
Parachute Technician Certificates.....	25	.05	12/15/43	4	None	None	
Traffic Control Tower Operator Certificates.....	26	.05	10/10/45	3	None	None	
Aircraft Dispatcher Certificates.....	27	.05	7/1/46	1	None	None	
Physical Standards for Airmen.....	29	.05	1/10/46	1	None	None	
Flight Radio Operator Certificates.....	33	.05	8/1/47	1	None	None	
Flight Navigator Certificates.....	34	.05	8/1/47	1	None	None	
Flight Engineer Certificates.....	35	.05	3/15/47	1	None	None	
Operation Rules							
Air Carrier Operating Certification.....	40	.10	7/10/46	2	None	None	
Scheduled Air Carrier Operations Outside Continental United States.....	41	.05	5/1/46	20	None	None	
Nonscheduled Air Carrier Certification and Operation Rules.....	42	.05	8/1/46	9	.15	11/1/46	
General Operation Rules.....	43	.05	12/1/47	2	None	None	
Foreign Air Carrier Regulations.....	44	.05	11/1/47	1	None	None	
Operation of Moored Balloons.....	48	.05	9/28/47	1	None	None	
Transportation of Explosives and other Dangerous Articles.....	49	.05	7/1/45	1	None	None	
Air Agencies							
Airman Agency Certificates.....	50	.05	4/30/46	1	.15	5/15/46	
Ground Instructor Rating.....	51	.05	12/15/43	2	None	None	
Repair Station Rating.....	52	.05	10/1/42	1	No stock	2/41	
Mechanic School Rating.....	53	.05	8/1/42	1	Free	5/40	
Parachute Loft Certificates and Ratings.....	54	.05	1/21/43	1	None	None	
Air Navigation							
Air Traffic Rules.....	60	.10	10/8/47	3	(?)	None	
Scheduled Air Carrier Rules.....	61	.10	8/1/46	18	None	None	
Miscellaneous							
Rules of Practice Governing Suspension and Revocation Proceedings.....	97	Free	1/1/47	1	None	None	
Definitions.....	98	No stock	10/15/42	1	None	None	
Mode of Citation.....	99	Free	11/15/40	1	None	None	
Regulations of the Administrator							
Aircraft Registration Certificates.....	501	Free	5/1/47	1			
Dealers' Registration Certificates.....	502	Free	5/1/47	1			
Recordation of Aircraft Ownership.....	503	Free	5/1/47	1			
Notice of Construction or Alteration of Structures on or near Civil Airways.....	525	Free	7/23/43	1			
Seizure of Aircraft.....	531	Free	12/8/41	1			
Reproduction and Dissemination of Current Examination Materials.....	532	Free	1/15/43	1			
Federal Aid to Public Agencies for Development of Public Airports.....	550	Free	1/9/47	1	1 thru 8. In Federal Register, vol. 12, Nos. 74, 92, 112, 122, 161, 187, 198. Total cost, \$1.05.		
Acquisition by Public Agencies for Public Airport Purposes of Land Owned or Controlled by the United States.....	555	Free	1/9/47	1	1. In Federal Register, vol. 12, No. 37, 154.		
Claims for Reimbursement for Rehabilitation or Repair of Public Airports Damaged by Federal Agencies.....	560	Free	1/9/47	1			

1 Certain aircraft may comply with the provisions of this part or part 04a.

2 Special regulations 340 and 340D.

3 Special regulations 361A, 361D, 396.

4 Special regulations 397, 397A.

5 SR-317.

6 Special regulations 361A, 361D, 397, 397A, SR-317.

7 Combined with Flight Information Manual, Vol. 2, No. 2.

SD-740 suspends for 6 months, private certificate with airplane single-engine land rating of Darwin T. Sylvester for low flying over a congested area of the city of Earlville, Ill. (March 2).

SD-741 suspends for 6 months, student certificate of Claude B. Curry for low aerobatic flying over Dallas, Tex. (February 11).

SD-743 suspends for 60 days, student certificate of Roy A. Jacobson for carrying a passenger (February 24).

SD-744 suspends for 6 months, student certificate of Howard E. Frye for low aerobatic flying over Northwest Chicago and Park Ridge, Ill. (February 25).

SD-746 suspends for 9 months, student certificate of Robert B. Geary for carrying passengers (February 24).

SD-751 suspends for 4 months, private certificate of Arthur R. Polen for executing two loops when neither he nor his passenger were equipped with parachutes (February 27).

SD-753 suspends for 6 months, student certificate of Paul S.

NOTE: Those parts and manuals for which there is a price are obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. Remittances should be by check or money order, payable to the Superintendent. Currency is sent at sender's risk. Amendments, Special Regulations and free Parts are obtained from the Publications Section, Civil Aeronautics Board, Washington 25, D. C.; free Manuals and Regulations of the Administrator from the CAA Office of Aviation Information, Dept. of Commerce, Washington 25, D. C.

Savage for low flying over the town of Dyer, Tenn., a congested area (February 25).

SD-756 suspends for 6 months, private certificate of Adelbert R. Ring for low flying over the congested area of the village of Goodman, Wis. (February 25).

SD-757 suspends for 6 months, private certificate of John S. Swieraki for low flying over Commack, N. Y. (March 4).

S-140 suspends for 30 days, any pilot certificate held by John J. Pfaffinger (Feb. 11).

S-142 suspends for 6 months, any pilot certificate held by Charlie E. Acery, Jr., for low flying over a small number of school children (February 19).

S-143 suspends for 6 months, any pilot certificate held by Donald Sholberg (February 26).

(See Official Actions, page 59)

# Scheduled Air Carrier Operations

Source: CAB Form 41

## Domestic Trunk Lines—February 1948

Operator	Revenue miles	Revenue pas- sengers (undup- licated)	Revenue pas- senger-miles (000)	Express and freight (tons)	Ton-miles flown		Passenger seat- miles (000)	Revenue pas- senger load fac- tor (percent)
					Express	Freight		
American Airlines, Inc.	3,405,257	139,113	66,616	3,405.0	389,298	1,285,009	119,119	55.92
Braniff Airways, Inc.	741,478	31,010	11,327	286.0	69,900	87,529	22,810	49.66
Chicago & Southern Air Lines, Inc.	446,165	15,041	6,173	188.0	42,379	30,743	11,768	52.46
Colonial Air Lines, Inc.	175,062	7,626	2,145	21.8	3,976	1,629	3,657	58.65
Continental Air Lines, Inc.	369,773	8,711	3,179	45.0	9,060	13,163	7,618	41.73
Delta Air Lines, Inc.	929,302	28,310	12,918	331.0	65,347	106,651	26,883	48.05
Eastern Air Lines, Inc.	3,742,655	138,980	84,290	990.5	340,934	331,209	134,861	62.50
Inland Air Lines, Inc.	177,959	4,673	1,667	17.0	3,094	3,278	3,381	49.30
Mid-Continent Airlines, Inc.	496,204	18,689	5,334	84.0	13,674	12,716	9,764	55.65
National Airlines, Inc.	106,961	3,696	1,907	40.7	8,203	27,516	3,682	51.79
Northeast Airlines, Inc.	219,960	15,954	2,947	112.8	9,563	8,661	7,660	38.47
Northwest Airlines, Inc.	1,047,416	33,862	16,965	337.9	121,892	77,866	33,575	50.53
Pennsylvania-Central Airlines Corp.	1,075,180	54,963	14,031	1,108.0	147,023	279,471	32,882	42.68
Transcontinental & Western Air, Inc.	3,604,265	69,632	54,230	1,152.0	405,894	587,892	94,130	57.61
United Air Lines, Inc.	3,961,261	103,123	58,359	2,290.0	532,081	1,113,421	98,730	59.11
Western Air Lines, Inc.	469,464	20,199	7,743	172.0	19,822	49,894	14,984	51.68
Total	20,968,362	693,582	349,934	10,581.7	2,182,140	4,016,648	625,504	55.94

## Domestic Trunk Lines—January–February 1948

Operator	Revenue miles January–February		Revenue passengers January–February		Revenue passenger-miles (000) January–February		Express & freight (tons) January–February	
	1948	1947	1948	1947	1948	1947	1948	1947
American Airlines, Inc.	7,046,094	8,792,697	283,682	313,453	141,274	166,379	6,773.0	3,314.0
Braniff Airways, Inc.	1,604,030	1,650,735	69,620	77,482	25,352	27,307	575.0	363.0
Chicago & Southern Air Lines, Inc.	947,989	1,016,975	32,005	34,874	13,168	13,757	442.0	268.0
Colonial Air Lines, Inc.	352,022	364,552	14,460	14,454	4,101	4,166	42.6	29.0
Continental Air Lines, Inc.	774,963	741,827	19,396	22,856	7,096	7,629	84.0	68.0
Delta Air Lines, Inc.	2,005,038	1,731,661	61,101	65,581	27,604	31,824	704.0	349.0
Eastern Air Lines, Inc.	7,913,497	6,861,681	284,298	230,110	170,465	138,795	2,083.4	1,275.3
Inland Air Lines, Inc.	370,922	293,958	9,891	11,011	3,640	2,825	31.0	15.8
Mid-Continent Airlines, Inc.	1,032,513	800,481	38,118	32,810	11,356	9,980	166.0	67.8
National Airlines, Inc.	719,935	1,332,694	23,737	48,423	12,263	29,423	283.1	179.1
Northeast Airlines, Inc.	453,925	548,233	29,297	39,790	5,448	7,495	279.8	113.5
Northwest Airlines, Inc.	2,178,364	2,765,595	69,055	75,934	36,200	38,384	747.8	461.4
Pennsylvania-Central Airlines Corp.	2,204,628	2,324,679	113,860	122,076	29,581	30,088	2,467.0	1,675.0
Transcontinental & Western Air, Inc.	7,856,427	6,316,647	147,839	107,846	118,352	83,213	2,522.0	1,452.0
United Air Lines, Inc.	8,176,120	8,040,781	209,302	210,112	122,004	129,362	4,803.0	2,373.0
Western Air Lines, Inc.	955,677	1,230,700	40,312	61,939	15,667	23,729	332.0	304.9
Total	44,592,145	45,013,896	1,445,973	1,468,751	743,571	744,356	22,335.7	12,308.8
Index (1947=100)	99.06	100.0	98.45	100.00	99.89	100.00	181.46	100.00

Operator	Ton-miles flown				Passenger seat-miles (000) January–February		Revenue passenger load factor (percent) January–February	
	Express January–February		Freight January–February		1948	1947	1948	1947
	1948	1947	1948	1947	1948	1947	1948	1947
American Airlines, Inc.	825,086	755,478	2,483,338	1,005,229	247,489	272,532	57.08	61.05
Braniff Airways, Inc.	146,252	121,048	159,252	28,034	49,734	46,641	50.98	58.55
Chicago & Southern Air Lines, Inc.	99,723	88,723	71,882	22,694	25,027	26,060	52.62	52.79
Colonial Air Lines, Inc.	7,868	6,794	2,762	0	7,381	7,100	55.56	58.68
Continental Air Lines, Inc.	14,714	14,128	25,868	16,900	15,967	15,276	44.44	49.94
Delta Air Lines, Inc.	141,875	114,653	221,641	67,030	57,956	50,839	47.63	62.60
Eastern Air Lines, Inc.	682,997	599,928	658,295	172,807	285,181	211,218	59.77	65.71
Inland Air Lines, Inc.	7,047	3,420	5,220	1,246	7,076	5,657	51.44	49.94
Mid-Continent Airlines, Inc.	27,545	19,450	27,292	2,734	20,274	16,099	56.01	61.99
National Airlines, Inc.	77,622	32,893	155,151	116,855	23,731	43,331	51.68	67.90
Northeast Airlines, Inc.	16,950	15,664	19,669	756	14,540	17,842	37.47	42.01
Northwest Airlines, Inc.	263,120	237,146	174,184	52,367	69,379	73,710	52.18	52.07
Pennsylvania-Central Airlines Corp.	324,638	324,086	621,923	200,887	67,595	75,774	43.76	39.71
Transcontinental & Western Air, Inc.	937,825	821,053	1,298,893	487,391	204,505	144,439	57.87	57.61
United Air Lines, Inc.	1,137,644	906,491	2,278,907	1,066,911	203,457	195,736	59.97	66.09
Western Air Lines, Inc.	41,523	68,936	91,708	56,321	31,274	45,494	50.10	52.16
Total	4,752,429	4,129,891	8,295,985	3,298,162	1,330,566	1,247,748	55.88	59.66
Index (1947=100)	115.07	100.00	251.53	100.00	106.64	100.00	93.66	100.00

Passenger-miles flown (total revenue and non-revenue, in thousands): January—406,599; February—364,344; Total—770,943.

## Domestic Territorial Lines—February 1948

Operator	Revenue miles	Revenue passengers	Revenue passenger-miles (000)	Express and freight (tons)	Ton-miles flown		Passenger seat-miles (000)	Revenue passenger load factor (percent)
					Express	Freight		
Caribbean-Antilles Airlines, Inc.	30,786	6,262	390	7.1	0	484	774	50.39
Hawaiian Airlines, Ltd.	232,849	24,463	3,438	359.0	9,998	43,097	5,102	67.39
Total	263,635	30,725	3,828	366.1	9,998	43,581	5,876	65.15



# Scheduled Air Carrier Operations—Concluded

## Domestic Feeder Lines—February 1948

Operator	Revenue miles	Revenue passengers	Revenue passenger-miles (000)	Express and freight (tons)	Ton-miles flown		Passenger seat-miles (000)	Revenue passenger load factor (percent)
					Express	Freight		
All American Aviation, Inc.	115,218	0	0	11.2	1,536	0	0	-
Challenger Airlines Co.	103,660	961	231	8.0	629	2,014	2,177	10.61
Empire Air Lines, Inc.	69,001	723	153	2.0	384	0	690	22.17
Florida Airways, Inc.	67,663	760	110	2.4	234	0	541	20.33
Los Angeles Airways, Inc.	16,509	0	0	0	0	0	0	-
Monarch Air Lines, Inc.	107,761	1,159	261	22.0	627	4,259	1,946	13.41
Piedmont Aviation, Inc. (2/20/48)	6,528	100	31	5	28	0	137	22.63
Pioneer Air Lines, Inc.	158,845	3,505	896	7.0	1,084	1,147	3,833	23.38
Southwest Airways Co.	137,214	4,660	881	43.0	2,039	5,614	3,056	28.83
Trans-Texas Airways	96,037	624	165	2.0	208	42	2,429	6.79
West Coast Airlines, Inc.	86,854	2,756	365	5.5	584	0	1,576	23.16
Wisconsin Central Airlines, Inc. (2/24/48)	4,225	23	4	1.0	71	0	0	-
Total	989,515	15,271	3,097	104.6	7,424	13,076	16,385	18.90

\*Does not include Wisconsin Central.

## International and Overseas Air Carriers—January 1948

Operator	Revenue miles	Revenue passengers	Revenue passenger-miles (000)	Express and freight (tons)	Ton-miles flown		Passenger seat-miles (000)	Revenue passenger load factor (percent)
					Express	Freight		
American Airlines, Inc.	155,244	4,366	3,687	143.0	0	92,335	6,591	55.94
American Overseas Airlines, Inc.	434,894	2,761	7,708	45.6	155,945	0	16,481	46.77
Chicago & Southern Air Lines, Inc.	41,100	1,065	730	8.0	0	5,195	1,850	39.46
Colonial Airlines, Inc.	51,463	1,019	798	8.4	0	6,636	2,261	35.29
Eastern Air Lines, Inc.	64,480	1,653	1,719	15.0	0	24,237	3,598	47.78
National Airlines, Inc.	35,811	3,035	923	53.2	16,527	0	1,649	55.97
Northwest Airlines, Inc.	324,430	1,706	3,139	23.0	2,551	69,111	7,493	41.89
Pan American Airways, Inc.:								
Atlantic Division	920,656	6,427	16,541	106.2	438,197	0	28,310	58.43
Latin American Division	2,432,862	58,760	46,509	899.0	1,253,522	0	91,986	50.56
Alaska Operations	170,333	1,672	1,882	77.0	101,596	0	5,138	36.63
Pacific Operations	1,242,422	6,761	20,486	87.0	291,490	0	31,137	65.79
Pan American-Grace Airways, Inc.	485,300	8,198	8,526	190.0	125,593	0	14,955	58.82
Transcontinental & Western Air, Inc.	864,113	3,905	12,583	64.0	274,302	0	29,401	42.80
United Air Lines, Inc.	148,800	1,171	2,810	5.0	11,747	0	4,685	59.98
Uruba, Medellin & Central Airways, Inc.	14,608	229	76	13.0	4,260	0	258	29.46
Total	7,386,516	102,728	128,117	1,737.4	2,675,730	197,514	245,333	52.22

## Official Actions . . . Civil Aeronautics Board

(Continued from page 57)

S-145 suspends for 4 months, pilot certificate of Milo C. Lehman (March 10).

S-146 suspends for 60 days, pilot certificate of Harlan W. Porter (March 10).

### Revocations

SD-677 revokes temporary private certificate of Frederick Rozzi, because while carrying a passenger, he flew at less than 1,000 feet over a congested area of Old Orchard Beach, Maine (Dec. 4).

SD-688 revokes student certificate of Ernest G. Gill, for piloting an aircraft while under the influence of intoxicating liquor (Jan. 13).

SD-695 revokes student certificate of Lawrence C. Beater, for carrying a passenger (Jan. 20).

SD-700 revokes student certificate of John J. Pollack, for low flying and performing numerous dives and pull-ups at extremely low altitudes over houses and an open assembly of persons (Jan. 30).

SD-704 revokes private pilot and single-engine land rating of Leonard C. Waibel for piloting a plane on a cross-country flight without specific authorization from the owner of the craft; the flight ended in a crash due to engine failure because Waibel had not checked his gas supply before taking off (January 19).

SD-708 revokes student certificate of Guy A. Davis for executing a series of dives to altitudes of from 30 to 50 feet along the streets in a congested residential section of San Antonio, Tex. (February 19).

SD-709 revokes student certificate of Abraham H. Colson, Jr., for low flying over a congested area of Jacksonville, Fla. (February 10).

SD-714 revokes student certificate of Jesse P. Gilleland for low flying over and around Indianatown, S. C. (February 19).

SD-716 revokes student certificate of Arthur E. Mandell for low flying over the north edge of Faribault, Minn., near intersection of highways 21 and 65 (February 10).

SD-717 revokes student certificate of Harry Q. Anderson for carrying a passenger (February 10).

SD-721 revokes private certificate with single-engine land rating of Robert J. Seamon for low flying over a congested residential area of Nashville, Tenn. (February 11).

SD-729 revokes student certificate of Karl H. Banks for carrying a passenger. (February 5).

SD-732 revokes student certificate of Lawrence A. Johnson for low flying over a residential area of Chicago, Ill., in the vicinity of Thomas Street and Lamon Avenue, and St. Ann's Hospital which was outside the local flying area designated by his instructor (March 4).

SD-733 revokes student certificate of Richard A. Ortega for low flying over the city of Haward, Nehr. (January 20).

SD-737 revokes private certificate and airplane single-engine land ratings of James B. Rice for piloting an aircraft while under the influence of intoxicating liquor (March 1).

SD-745 revokes student certificate of Frank J. Di Marco for low flying over Cleveland, Ohio (February 25).

SD-747 revokes student certificate of Roy L. Finch for low flying in the vicinity of a farm and of Jasper County Airport and St. Joseph College, Rensselaer, Ind. (February 21).

SD-748 revokes student certificate of Lowell M. Meinerts for carrying a passenger (February 25).

SD-749 revokes student certificate of Donald C. Dimmig for carrying a passenger (February 26).

SD-750 revokes private certificate with single-engine land rating of Worth Whitaker for executing stalls, abrupt dives and pull-ups, and a steep bank at altitudes as low as 50 feet over and in the vicinity of the Monroe, N. C., airport and executing a right-hand turn in the traffic pattern of the airport contrary to the established traffic pattern of the airport (February 25).

SD-752 revokes private certificate with airplane single-engine land rating of Elvin E. Glasburn for low flying in the vicinity of Monticello, Ind. On the flight, Glasburn struck wires across a river which resulted in a crash and the death of his passenger (February 26).

SD-754 revokes student certificate of Glenn Hackbarth for transporting a passenger and performing aerobatics when neither he nor his passenger were equipped with parachutes (February 21).

SD-755 revokes student certificate of Billy W. Denson for carrying a passenger (February 26).

### Miscellaneous

S-141 denies request of Wesley A. Magoon, age 20, for a waiver of section 26.1 (a) of the Civil Air Regulations as amended, which provides that an Air Traffic Control Tower Operator's certificate issued to a member of the armed forces who is under 21 years of age shall not be valid for other than military duty until the holder reaches that age (February 16).

S-144 grants petition of Ellsworth F. Wilkinson for a waiver of section 25.2 (b) of the Regulations so that he may be issued a parachute technician certificate with senior parachute rigger grade (March 2).

SD-697 terminates proceeding concerning John B. Rountree (Jan. 20).

SD-710 dismisses complaint of Administrator of Civil Aeronautics requesting that the commercial certificate with single-engine and rating of Wm. A. Leavell be suspended or revoked (February 10).

SD-719 finds that the public interest does not require any action be taken with regard to the commercial certificate held by Leslie A. Gilbert (February 24).

SD-726 dismisses complaint of Administrator of Civil Aeronautics

## Air Cargo Carried in 1947 Up 144% Over Previous Year

Air cargo transported by domestic certificated trunk lines continued to increase sharply during 1947 while passenger traffic showed signs of leveling off. Air freight registered a greater increase than any other airline traffic category. Volume rose from 14,433,101 ton-miles in 1946 to 35,213,590 ton-miles in 1947, a gain of 144 percent. During the last quarter of 1947 alone, 14,560,264 ton-miles were hauled. This vast upsurge in freight traffic was largely the result of the new low rates put into effect by the airlines during the latter half of the year.

Despite the increasing emphasis placed on the promotion of air freight, air express also enjoyed a substantial growth during 1947. Volume rose to 28,533,362 ton-miles from 1946's total of 23,651,666, an increase of 21 percent. Air express recorded its biggest month of the year in December 1947 when 3,281,007 ton-miles were carried.

Figures for the new year reflect the seasonal decline which usually sets in after the heavy holiday traffic. Air express volume declined to 2,570,289 ton-miles in January 1948 and 2,182,140 ton-miles in February compared with 3,281,007 ton-miles in December. Air freight dropped only slightly with volume running to 4,279,337 ton-miles in January versus 4,712,246 in December. This compares with 1,507,087 ton-miles in January 1947.

requesting the suspension or revocation of the private certificate with single-engine land rating of Henry W. Mason (February 7).

SD-738 finds that the public interest does not require any action be taken with regard to the commercial certificate with airplane single-engine land rating held by Glen L. Gustafson (March 2).

SD-742 terminates proceedings with regard to the air agency certificate held by Macon Airmotive Service, Inc. (February 10).

## O'Connell Sworn in For Six-year Term As Board Chairman

Joseph J. O'Connell, Jr. has been sworn in as a Member of the Civil Aeronautics Board by the Honorable Harold M. Stephens, Chief Justice of the United States Circuit Court of Appeals in Washington. At the same time Mr. O'Connell was designated Chairman of the Civil Aeronautics Board by Presidential letter of authority.

Mr. O'Connell, who succeeds Dean James M. Landis as Chairman of the Board, was appointed to a six-year term which expires December 31, 1953.

A graduate of the University of Vermont and Fordham University School of Law, Mr. O'Connell was admitted to the New York bar in 1931, where he engaged in the general practice of law for three years. In 1933 he was employed by the Public Works Administration in a legal capacity in connection with the financing and construction of PWA projects. In 1938 he joined the Treasury Department where he served first as Special Assistant to the General Counsel, then as Assistant General Counsel, and in 1944 was named General Counsel by the President. He resigned that position, having served under Treasury Secretaries Morgenthau, Vinson, and Snyder, to become a member of a Washington law firm in 1947.

**Extensive Experience.**—Mr. O'Connell's work in the Treasury Department covered the entire range of the Department's activities, including taxes, Treasury financing, customs, procurement and Department and tax legislation. Special assignments included membership on the Temporary National Economic Committee (1939-1941) and responsibility for supervision and investigation of General Aniline & Film Corporation, a large German-dominated concern, supervised by the Foreign Funds Control Division of the Treasury Department, and ultimately taken over by the Government.

Mr. O'Connell is a Democrat. He was born in Saranac Lake, New York, November 8, 1905, is married, and has two daughters.

## CAB Awards Aleutian Route

The Civil Aeronautics Board has authorized Robert C. Reeve, doing business as Reeve Airways, to transport persons, property and mail between points in Alaska and the Aleutian Islands and the Pribilof Islands. The Board limited the temporary certificate to a period of five years from April 8, 1948.

The authorization for Reeve Airways covers a regular route between the terminal point Anchorage, Alaska, the intermediate points Cold Bay, Dutch Harbor, Umnak Island, Atka Island, Adak Island, Amchitka Island, and Shemya Island, and the terminal point Attu Island. The authorization also included operations over an irregular route between any and all points on the foregoing route and the Pribilof Islands.

## RTCA Issues Nomenclature Report

"Nomenclature: Air Navigation—Air Navigation Systems" is the title of a new report just issued by the Radio Technical Commission for Aeronautics. This report, number 22-48/DO-11, was prepared by Special Committee 24 and is available for distribution to interested organizations, agencies and individuals. Requests should be addressed to the RTCA Secretariat, Department of State Building, Room 597, 17th and Pennsylvania Avenue N. W., Washington 25, D. C.

## First Air-route Traffic Controller Certificate Given



The International Civil Aviation Organization recently recommended that air route traffic controllers, as well as airport traffic controllers, be certificated.

The outgrowth of this recommendation, which was adopted by the CAA, is shown in the above photograph. Norbert J. Roy, Chief Controller of the New York Air Route Traffic Control Center is shown being presented with Certificate No. 1-1 by Ora W. Young, CAA Administrator for Region 1. Mr. Roy was

honored with the No. 1 certificate because of the excellent manner in which he has been running the New York Center for the past year and a half.

In the group, reading from left to right, are: H. DePue, Assistant Regional Administrator; S. Doroff, Chief, Performance Standards Staff; Mr. Young; J. Toomey, Performance Standards Staff; Mr. Roy; and C. J. Stock, Chief, Air Traffic Control Division, all of the First Region.

## Engine Manufacturers Report January Sales Increased 10%

Aircraft engine manufacturers reported their February shipments totalled \$25,959,000—a 10 percent gain over January. Military engine shipments accounted for 79 percent of the total dollar value.

Civil shipments increased both in number and value—1,007 engines valued at \$3,562,000 compared to 779 valued at \$3,149,000 in January. Spare parts shipment value advanced 16 percent from \$1,572,000 to \$1,818,000.

Shipments to the United States military services totalled 355 engines valued at \$16,976,000 plus \$3,529,000 in spare parts. The figures for January were 287 engines worth \$15,203,000 and \$3,682,000 in spare parts.

## Minimum Air Freight Rates Announced by CAB

An order prescribing lawful minimum rates for air freight transportation has been announced by the Civil Aeronautics Board. The rates determined and prescribed are 16 cents per ton-mile for the first 1,000 ton-miles in any one shipment and 13 cents per ton-mile for all ton-miles in excess of 1,000 ton-miles in any one shipment.

This action by the Board was the culmination of a lengthy hearing on freight rates now in effect and certain proposed freight rates which the Board had suspended in October 1947. Over thirty carriers and intervenors took part in the hearing and most of these filed briefs and offered oral argument before the Board.

In an opinion accompanying issuance of the order, the Board concluded that the rates under investigation would endanger the sound development of the air freight industry and were in conflict with the Congressional declaration of policy against destructive competitive practices. The opinion also pointed out that continuance of such unsound practices would undermine the previously authorized experiment of testing the ability of all-freight carriers to make a

## New Series in ILS Charts Available From C & G Survey

The first four in a new series of Instrument Landing System Approach Charts are now ready for distribution by Coast and Geodetic Survey.

The charts, which sell for five cents each, cover Washington, New York (LaGuardia), Indianapolis, and Chicago. More than 50 additional charts, covering the ILS installations now operated by the Civil Aeronautics Administration will be available within 60 days. Eventually, about 130 of the charts will be published, as the CAA puts additional ILS installations into operation.

**Contain Only ILS Data.**—The new charts have been made simple and clear by eliminating all data which is not involved in using the ILS. They will be revised as often as necessary, and are in loose-leaf form for easy handling in the air.

In addition to the general chart, perspective drawings on the back help to clarify ILS procedure. The charts are in black and white to make them easier to read under colored cockpit lights, and also to permit quick, inexpensive revision.

The new ILS charts should not be confused with the Instrument Approach and Landing Charts, which have been published for some time. The ILS charts are useful only for ILS approaches.

The new charts may be ordered from Coast and Geodetic Survey, Washington 25, D. C. A discount of one-third is given on orders of \$10 or more, and subscriptions will be accepted at \$1 for 20 copies of any one chart, plus all revisions for the following year.

contribution to the national economy and defense. The Board found that the rates do not compensate carriers either for current costs or for costs reasonably attainable.

The Board's opinion states that under these circumstances action by it to prescribe minimum rates is imperative. However, the opinion announces that the Board will permit modification of the minimum rates upon application or on its own initiative.



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